

## LIMITED PHASE II INVESTIGATION

## Former Fast Food Restaurant 9615 Buckeye Road Cleveland, Ohio 44104

## March 7, 2012

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## 1.0 INTRODUCTION

Partners Environmental Consulting, Inc. (Partners) was contracted by Cuyahoga County Land Reutilization Corporation (CCLRC or Client) to conduct a Limited Phase II Investigation at 9615 Buckeye Road in the City of Cleveland, Cuyahoga County, Ohio (Property). **Figure 1** is presented as a Property Location Map.

The purpose of the investigation was to evaluate the extent to which historical activities at the Property or on surrounding sites have adversely impacted the Property, and to what effect such impact might have on the planned redevelopment of the Property. Partners understands that the Client intends to redevelop the Property for commercial/retail use.

## 1.1 Property Description

The Property is approximately 0.94-acres and is bound to the north by Wamelink Road and commercial development, to the south by Buckeye Road and the Buckeye-Woodhill RTA Blue/Green Line Substation, to the east by Woodhill Road and residential/institutional development and a vacant church, and to the west by vacant grass covered lots. The Property is occupied by an approximately 3,200 ft<sup>2</sup> vacant fast food restaurant building (formerly a Burger King). The attached Boring, Monitoring Well and Sample Location Map depict the Property and surrounding sites (**Figure 2**).

## 2.0 PREVIOUS INVESTIGATIONS

## 2.1 Previous Investigations by Partners

Partners prepared a report titled *Phase I Environmental Site Assessment, Former Fast Food Restaurant,* 9615 Buckeye Road, Cleveland, Ohio (dated October 10, 2011) for the Client. The findings of environmental significance from the Phase I Environmental Site Assessment (Phase I) are summarized below:

## **Property**

• Gasoline Filling Station and Associated USTs: Sanborn maps and city directories indicated that the south-central portion of the Property was developed with an auto repair facility and associated filling station (2780 Woodhill Road) from 1925 through 1951, when the filling station was rebuilt. According to records, the filling station was again rebuilt in 1973 and assigned a new street address (2796 Woodhill Road). According to the Cleveland Department of Building and Housing (CDBH) records, up to four (4) underground storage tanks (USTs) were installed in various locations on this portion of the Property. By 1973, three (3) gasoline USTs were in use on the Property until they were removed in 1984. According to the Cleveland Fire Protection Bureau (CFPB) records, these USTs were reported as leaking in 1975 and again in 1985. An investigation conducted by the CFPB between April and August 1985 determined that free product was present in the basement of two (2) dwellings located west of the Property (9527 and 9607 Buckeye Road). The CFPB activities included installing sump pumps, a recovery system, and four (4) "test holes". It was not reported where the "test holes" were drilled or whether soil or groundwater samples were collected. The Property was redeveloped in 1988 for use as a Burger King restaurant.

## **Surrounding Sites**

• Fork Lift Repair, Manufacturing Operations and UST: The north adjoining site (2754 Woodhill Road) was developed with a Service Shop and Material Handling Equipment Storage facility in approximately 1956. This facility is located hydraulically crossgradient in the inferred direction of groundwater flow from the Property. This facility was occupied by R.M. Slife & Assoc., a fork lift repair and new/used tow motor sales facility, from 1956 through the 2000s, and various equipment, truck and manufacturing operations since at least 1961 through 2011. CFPB records document the use of battery acid, paint, thinner, a spray room, and hydraulic and motor oil drums stored in the basement. A 1,000-gallon gasoline UST was installed at this site in 1974, and this tank was replaced with a 2,000-gallon UST in 1982. The tank cavity was located south of the facility, along Wamelink Avenue, approximately 40 feet north of the Property. The 2,000-gallon gasoline UST was removed from the site in 1992, underwent Bureau of Underground Storage

Tank Regulations (BUSTR) closure activities and was issued a No Further Action (NFA) letter on December 12, 1995. Based on the proximity to the Property and location hydraulically crossgradient in the inferred direction of groundwater flow, Partners concluded that historic fork lift repair, manufacturing operations and the former UST had the potential to adversely impact the Property.

• Historic Filling Station Facilities: The south adjoining site was developed with a gasoline filling station (2795-2797 Woodhill Road, also known as 9700 Buckeye Road) in 1921. This facility was located approximately 125 feet south-southeast of the Property, at the southeast corner of the intersection of Buckeye Road and Woodhill Road, and is hydraulically upgradient in the inferred direction of groundwater flow from the Property. Three (3) 1,000-gallon USTs were installed at this facility in 1921 and were abandoned in place and filled with sand and water in 1966. This facility was converted for use as an "Office" (9700 Buckeye Road) associated with a Used Auto Sales Lot in 1956. The facility was converted for use as a food carryout service in 1967, then for use by Triangle Auto Parts in the 1970s until it was razed in 2009. During occupancy by Triangle Auto Parts, this facility was permitted for the use of sulfuric acid in batteries, lacquer primer, thinner and reducer, a 150-gallon solvent cleaning tank, and a 100-gallon degreaser tank. A CFPB inspection in 1969 indicated the facility conducted minor repairs of parts brought into the store. Based on the proximity to the Property and location hydraulically upgradient in the inferred direction of groundwater flow, Partners concluded that historic gasoline filling station, auto sales and auto parts repair operations had the potential to adversely impact the Property.

Based on a review of historical records, CFPB records and CDBH records, a site located approximately 400 feet southeast of the Property (9801 Buckeye Road) was developed with a gasoline filling station in 1949. This facility is located hydraulically upgradient in the inferred direction of groundwater flow from the Property. This filling station operated four (4) 3,000-gallon gasoline USTs installed in 1950. CFPB records indicate an application to repair a leaking 3,000-gallon UST was filed in 1968. A 500-gallon used oil UST was removed from this facility in 1976 and the facility was converted to a car wash. The four (4) 3,000-gallon USTs were removed in 1986. Based on the proximity to the Property and location hydraulically upgradient in the inferred direction of groundwater flow, Partners concluded that historical gasoline filling station operations had the potential to adversely impact the Property.

## 3.0 LIMITED PHASE II SITE INVESTIGATION ACTIVITIES

The Limited Phase II Investigation activities included a ground penetrating radar and electromagnetic survey, subsurface soil sampling, groundwater sampling, sub-slab soil vapor sampling, soil gas sampling and analytical testing. The Limited Phase II Investigation was conducted to evaluate the degree to which the Property may have been impacted by historical activities on and off the Property.

Prior to initiating field investigation activities, Partners prepared a *Sampling and Analysis Plan* (SAP) dated November 30, 2011. The SAP was submitted to the United States Environmental Protection Agency (USEPA) for approval. A copy of the approved SAP is included as **Appendix A**.

Partners advanced nine (9) soil borings (B-1 through B-4 and MW-1 through MW-5) and obtained soil and groundwater samples from the Property between January 18<sup>th</sup> and 24<sup>th</sup>, 2012. Five (5) of the borings (MW-1 through MW-5) were completed as groundwater monitoring wells. In addition, two (2) sub-slab soil vapor sample (SV-1, SV-2) were obtained from the interior of the existing building, three (3) soil gas vapor points (SGP-1 through 3) were installed outside and adjacent to the building, and one (1) ambient air sample (Background) was obtained from the exterior portion of the Property. **Figure 2** shows the locations of the soil borings, wells and soil vapor/air samples.

## 3.1 Ground penetrating Radar (GPR) and Electromagnetic Survey

Partners contracted Behr-Geo Environmental to conduct a non-intrusive investigation on the exterior portions of the Property using ground penetrating radar (GPR) and electromagnetic (EM) survey equipment. The GPR and EM surveys were completed on January 18, 2012.

The GPR survey was completed using ground penetrating radar with a 500 MHz transducer/receiver antenna on a grid with approximately five (5)-foot line spacing. The data generated by the GPR was interpreted in the field by qualified personnel.

The electromagnetic survey was completed over the same area as the GPR survey. The EM survey was completed using a Schonstedt Magnetic and Cable Locator instrument on an approximately 10-foot line spacing. The audible signal from the magnetic locator was interpreted in the field by qualified personnel.

The GPR and EM surveys identified no anomalies within the survey area consistent with what would be produced by a UST.

A copy of the GPR/EM survey report is included as **Appendix B**.

## 3.2 Soil Sampling and Analyses

Nine (9) soil borings were advanced using a track-mounted, direct push technology (Geoprobe<sup>™</sup>) sampling system. The borings were sampled continuously from below pavement to depths ranging from 11 to 12.5 feet below ground surface (bgs). The Geoprobe<sup>™</sup> drives a two (2)-inch outside diameter, stainless steel tube containing a new disposable acetate liner into the subsurface to continuously obtain soil samples. The soil is forced into the liner at continuous four (4)-foot intervals, and is then retrieved to the surface. Each four (4)-foot soil sample was visually observed, sampled, logged, and classified according to the Unified Soil Classification System (USCS) by a member of Partners' field staff.

Soil samples were divided into two (2) portions. One (1) portion was collected into new two (2)-ounce or four (4)-ounce, pre-cleaned glass jars with Teflon<sup>®</sup> septums, and the second portion was placed into a new re-sealable plastic bag for field screening purposes. Samples collected in the glass jars were labeled and placed into a cooler containing ice, pending submission to a qualified analytical laboratory for chemical analysis.

New disposable nitrile gloves were worn and changed between each sample to prevent possible cross-contamination. The stainless steel sampling equipment was decontaminated between sampling events with an Alconox® detergent rinse. The location of each boring is depicted on **Figure 2** and soil boring logs are provided in **Appendix C**.

Soil samples were field screened with a MiniRAE 2000 Photoionization Detector (PID), manufactured by RAE Systems, for the presence of organic vapors. The detector was calibrated prior to field activities using a known concentration of a gas standard in accordance with the manufacturers' specifications. Soil sample PID readings are included on the soil boring logs in **Appendix C**.

Borings not converted to monitoring wells were abandoned at the completion of field activities by filling each to grade with hydrated bentonite chips and excess cuttings. All excess soil cuttings from the monitor well borings were placed in two (2) labeled, steel 55-gallon drums and remain on the Property.

Select soil samples were submitted for laboratory analysis based on a combination of historical information for the area, field observations (visual or odor), PID screening results, and/or location. Based on the suspected conditions under assessment, selected soil samples were analyzed for one (1) or more of the following parameters:

- Volatile Organic Compounds (VOCs) by the Environmental Protection Agency (EPA) Method 8260, (six [6] samples). Soil samples for VOC analysis were collected using the TerraCore™ sampler or equivalent.
- Polynuclear Aromatic Hydrocarbons (PAHs) by EPA Method 8270, (six [6] samples).
- Total Petroleum Hydrocarbon (TPH) C<sub>6</sub>-C<sub>10</sub> by EPA Method 8015, (six [6] samples).
- TPH C<sub>10</sub>-C<sub>34</sub> by EPA Method 8015, (three [3] samples).
- Resource Conservation and Recovery Act (RCRA) 8 Metals Method 6010/7470, (two [2] samples).
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082 (two [2] samples).

Soil samples were submitted for analysis in a cooler containing ice, under appropriate chain-of-custody control, to Environmental Sciences Corporation (ESC) located in Mt. Juliet, Tennessee. The laboratory analytical report is included in **Appendix D**.

## 3.3 Groundwater Monitoring Well Construction, Groundwater Sampling and Analyses

Five (5) soil borings (MW-1 through MW-5) were converted into groundwater monitoring wells. The monitoring wells were installed utilizing an approximately three (3)-inch OD pipe with an expendable bottom plug and were constructed of new one (1)-inch inside diameter (ID) polyvinyl chloride (PVC) 0.010-inch slotted screen and PVC riser. The bottom of the screened section was placed at depths ranging from about 10.5 to 14 ft bgs to position the screen across the top of the water table. The PVC sections were connected using threaded joints equipped with rubber "O" rings. Monitoring well construction diagrams are included in **Appendix C**.

Prior to developing the groundwater monitoring wells, fluid levels and total depths for each well were measured to the nearest 0.01-feet using an electronic oil/water interface probe. On January 23, 2012, the monitoring wells were developed by bailing and surging to ensure good communication with the surrounding aquifer to the extent practical using a dedicated high-density polyethylene (HDPE) disposable bailer. The saturated volume in each well was calculated and recorded, and each well was developed by manually bailing until the saturated well volume was evacuated from each well. The monitor wells were bailed dry prior to removing three (3) saturated well volumes in all cases.

On January 24, 2012, groundwater samples were collected from monitor wells MW-1 through MW-5. Groundwater levels in each well were measured to the nearest 0.01-ft using an electronic oil/water interface probe on January 24 and February 14, 2012. No phase-separated hydrocarbons (free product) were observed in any of the wells. The saturated well volume in each well was calculated and recorded based on total water column length. Due to the minimal water columns present in the wells and very slow recharge rates, the wells were not purged prior to sampling, and water quality parameters (e.g. temperature, pH, specific conductivity, turbidity, dissolved oxygen [DO], and oxidation reduction potential [ORP]) could not be measured in the field. Well sampling data sheets are included in **Appendix E**.

Based on the suspected conditions under assessment, groundwater samples were analyzed for VOCs by EPA Method 8260 and PAHs by USEPA Method 8270. Groundwater samples to be tested for VOCs were placed in two (2) 40-milliliter (ml) amber volatile organic analysis (VOA) vials containing hydrochloric acid as a preservative. Samples to be tested for PAHs were placed in two (2) 40-ml amber glass VOA vials with no preservative. Sample containers and preservatives were provided by the laboratory. Samples were collected, labeled, and placed into a cooler containing ice, stored at 4°C, and submitted under appropriate chain-of-custody control to ESC. New disposable gloves were worn and changed between sample locations to prevent cross-contamination. The groundwater samples and completed chain-of-custody forms were submitted to ESC in a cooler containing ice. The laboratory report is included in **Appendix D**.

## 3.4 Sub-Slab Soil Vapor/Soil Gas Sampling and Analyses

On January 18, 2012, Partners installed one (1) sub-slab soil vapor sample point (SV-1) in the floor of the central portion of the existing building. Sample point SV-1 was installed by first drilling a 5/8-inch diameter hole through the approximately four (4)-inch concrete floor. A Cox-Colvin Vapor Pin™ was then inserted into the floor. On January 23, 2012, a Summa canister utilizing a three (3)-hour duration regulator was used to collect the sub-slab soil vapor sample from this point. One (1) sample of ambient air (Background) was obtained from an exterior area adjacent to the north portion of the existing building. The location of the Background sample was in an area believed to be unimpacted by the concerns being assessed and was obtained in order to evaluate potential background conditions. The sub-slab vapor sample (SV-1) and ambient air sample (Background) were submitted under completed chain-of-custody to ESC for analysis in accordance with EPA Method 8260B/EPA Compendium Method TO-15. Sample locations SV-1 and Background are depicted on **Figure 2**.

Based on the results of sub-slab soil vapor, soil, and groundwater analytical testing and discussion with CCLRC, it was determined that additional sub-slab soil vapor and soil gas sample points were needed to assess potential impacts to indoor air.

On February 14, 2012, one (1) additional sub-slab soil vapor sample point (SV-2) was installed in the southern portion of the existing building following the protocol discussed above. Three (3) soil gas sample points (SGP-1, SGP-2, and SGP-3) were installed utilizing direct push technology. Soil gas implants were installed within the open borings at depths of about 5 feet bgs based on groundwater measurements and subsurface conditions. Per Ohio EPA guidance, the soil gas implants were placed above the saturated zone in the subsurface. The soil gas implants were constructed of a one-half (0.5) inch diameter by six (6)-inch long, double-woven stainless steel mesh gas probe insert manufactured by Geoprobe<sup>TM</sup>. One-quarter (1/4)-inch polyvinyl tubing was attached to the top barb of the probe insert and extended approximately 1.5 feet above the existing surface grade. The annular space in each boring was filled with silica sand from the bottom of the boring/probe implant to six (6) inches above the top of the probe implant, for a final profile of 12 inches of silica sand pack. Granular bentonite was placed above the sand pack to the surface and hydrated with distilled water. Concrete was placed at the surface to secure the tubing. Soil gas implants were installed in general accordance with the procedures included in the Ohio EPA guidance document titled "Sample Collection and Evaluation Of Vapor Intrusion To Indoor Air for Remedial Response and Voluntary Action Programs", dated May 2010 and Partners' Field Standard Operating Procedure (FSOP) No. 041 (Soil Vapor Sampling Procedures). Soil gas implant construction diagrams are located on the boring logs presented in Appendix C.

Silicone tubing was used to connect each implant to a laboratory certified clean, one (1) liter SUMMA<sup>®</sup> canister. Prior to sampling, a low volume manual vacuum pump was utilized to purge approximately three (3) volumes of air from each implant and tubing. The flow regulator on each SUMMA<sup>®</sup> canister was used to collect a sample over a three (3) hour time period. Soil gas implant installation depths were recorded on the Soil Gas Implant Logs presented in **Appendix C**.

No sample was obtained from soil gas sampling point SGP-1 due to the presence of water in the sample tubing.

Samples obtained from SV-1, SV-2, SGP-2, and SGP-3 were labeled and submitted under appropriate chain-of-custody control to ESC for analysis. Soil gas samples were analyzed for VOCs in accordance with EPA Method 8260B/EPA Compendium Method TO-15. Sample locations SV-2 and SGP-1 through SGP-3 are depicted on **Figure 2**.

## 3.5 Quality Assurance/Quality Control (QA/QC) Sampling and Testing

QA/QC samples consisted of duplicate samples, equipment blanks, and trip blanks in accordance with the SAP. Trip blank samples were provided by the laboratory and stored and handled in the same manner as the samples collected at the Property. Duplicate samples were obtained from soil. Due to the lack of a sufficient water column in the monitor wells, there was not enough sample volume in the wells to obtain a groundwater duplicate sample. The results of duplicate analyses are presented in the appropriate analytical summary tables as discussed in **Section 6**. The following is a summary of the QA/QC samples collected during the Limited Phase II Investigation.

For soil and weathered shale, QA/QC samples were collected for the following:

- One (1) duplicate from B-1 (two [2] to four [4] feet) was submitted for TPH C<sub>6</sub>-C<sub>10</sub> and C<sub>10</sub>-C<sub>34</sub> analyses.
- One (1) duplicate from B-3 (two [2] to four [4] feet) was submitted for PCB analyses.
- One (1) duplicate from MW-1 (two [2] to four [4] feet) was submitted for RCRA Metals analyses.
- One (1) duplicate from MW-1 (10 to 12) was submitted for VOC and PAH analyses.
- One (1) equipment blank was submitted for VOC, PAH, RCRA metals, and PCB analyses. The
  equipment blank was prepared by pouring retail-grade deionized, distilled water over sampling
  equipment and collecting the water in laboratory-supplied containers.
- One (1) trip blank was submitted with the soil samples for VOC analysis.

For groundwater, QA/QC samples were collected for the following:

- One (1) equipment blank was submitted for VOC and PAH analyses. The equipment blanks were
  prepared by pouring retail-grade deionized, distilled water through sampling equipment and
  collecting the water in laboratory-supplied containers.
- One (1) trip blank was submitted with the groundwater samples for VOC analysis.

#### 4.0 COMPARISON STANDARDS

## 4.1 Potentially Applicable Comparison Standards

## Bureau of Underground Storage Tank Regulations (BUSTR)

Under the VAP, the generic petroleum standards are the standards developed by BUSTR under Ohio Revised Code (ORC) 3737.882(B). ORC 3746.04(B)(1) specifically directs the use of BUSTR's generic numerical clean-up standards for petroleum-related compounds at non-residential properties in the VAP. Under the VAP, the BUSTR generic standards apply to petroleum releases, regardless of the petroleum source unless a Property Specific Risk Assessment (PSRA) is performed. For initial evaluation of the data, Partners compared the appropriate analytical results to the action levels established under BUSTR as referenced in VAP rules. In certain instances, some compounds do not have a comparison standard under BUSTR.

## Ohio Environmental Protection Agency (EPA) Voluntary Action Program (VAP)

The results of soil and groundwater testing were compared to generic numeric standards established by the Ohio EPA VAP and described in Ohio Administrative Code (OAC) 3745-300-08. As indicated in the attached tables, some detected constituents do not have standards established under the Ohio EPA VAP. The Property is not presently a VAP site; however, the comparisons are considered sufficient for an initial discussion of site conditions.

VAP Generic Direct Contact Soil Standards (GDCS) for the Commercial/Industrial Land Use Category and Construction and Excavation Activities are cited for comparison to evaluate the results of soil analyses (OAC rule 3745-300-08). Constituents for which no GDCS have been derived were compared to the Ohio EPA VAP Chemical Information Database and Applicable Regulatory Standards (CIDARS), Supplemental Criteria.

TPH concentrations in soil were evaluated using the TPH Action Levels defined in OAC 1301: 7-9-13, as required by OAC 3745-300-08(B)(3), for Soil Class 1 (coarse grained soils).

The Property is located within the Cleveland City-Wide Urban Setting Designation (USD). It has been established by the Ohio EPA that no drinking water wells exist within the defined USD boundary or within one half (0.5) miles of the USD boundary. A USD ensures that groundwater is not expected to be used for potable purposes. Results of groundwater analyses were compared to the Ohio EPA VAP Unrestricted Potable Use Standards (UPUS) (OAC rule 3745-300-08). These VAP standards were developed based on the assumption that the groundwater could potentially be used as a source of water for drinking, cooking, and bathing. Constituents for which no UPUS has been derived were compared to the Ohio EPA VAP CIDARS, Supplemental Criteria. The groundwater standards described above do not apply to the Property due to the USD exception, and are being used for comparison purposes only.

## Sub-Slab/Soil Vapor Comparison Standards

In accordance with the Sample Collection and Evaluation of Vapor Intrusion to Indoor Air, Guidance for Ohio EPA's Remedial Response and Voluntary Action Programs, the results of the sub-slab soil vapor analysis were compared to the screening levels listed in the United States Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response (OSWER) Vapor Intrusion Guidance (November 2002) for the residential exposure scenario. Although the Property is planned for commercial retail use and soil sampling results were compared to the applicable commercial standards, residential standards were used for comparison purposes for the sub-slab/soil vapor sampling results due to the potential for soil vapors to migrate off-property into residential areas. Comparisons were made to the screening levels with a risk level of 1x10<sup>-5</sup> for cancer risk and non-cancer hazard index of 1 and an

attenuation factor of 0.1. For compounds for which no OSWER residential screening level was present, screening levels were calculated in accordance with the methods presented in the USEPA *Risk* Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part F, Supplemental Guidance for Inhalation Risk Assessment dated January 2009, to a target range of 1x10<sup>-5</sup> for cancer risk and non-cancer hazard index of 1 using toxicity data listed in the VAP CIDARS database. In addition, commercial standards were also calculated following the USEPA RAGS guidance. An attenuation factor of 0.1 was applied to the RAGS screening levels.

#### 5.0 SUBSURFACE CONDITIONS

Asphalt or concrete surfaced parking lots had a pavement thickness of approximately four (4) to six (6)-inches. The subsurface profile generally consisted of fill underlain by undisturbed deposits of clay and/or silt to depths ranging from five and one-half (5.5) to 11.5-feet below ground surface (bgs), below which is shale bedrock.

Fill material was encountered at all boring locations to depths ranging from four (4) to 10-feet bgs. Fill materials predominantly consisted of brown sandy clay with varying amounts of gravel, brick fragments, concrete fragments, sandstone fragments, some cinders, and/or trace amounts of gray slag. At MW-2, the fill consisted of brown silty clay with sand, gravel, and trace amounts of brick. At MW-3, the fill consisted of brown medium to coarse sand with varying amounts of gravel, clay, and concrete fragments.

Undisturbed soils generally consisted of brown and gray clay with varying amounts of shale fragments, gravel and/or sandstone fragments to depths ranging from 10 feet bgs (B-3) to 11.5 feet bgs (B-1; MW-5) underlain by brown and/or gray severely weathered shale except at B-2, B-4, and MW-4. At these locations, no undisturbed soils were present between the fill materials and shale. Undisturbed soils consisting of layered brown and gray clay, brown clayey silt, and brown and gray sandy clay were encountered at MW-5 at depths of four (4) to 11.5 feet bgs. Shale bedrock was encountered at depths ranging from five and one-half (5.5) feet bgs (B-2) to 11.5 feet bgs (B-1; MW-5). Sampler equipment refusal was encountered at the terminal depths of all borings.

Petroleum odors were evident in the soil samples from borings B-2, MW-1, MW-2, MW-3, and MW-4. Gasoline odors were apparent in the shale present in the 10 to 12 foot bgs sample interval at B-2, MW-1, MW-2, and MW-3. At MW-4, a petroleum odor was evident in the fill material at a depth of two (2) to four (4) feet bgs. Staining was not observed in any of the borings. PID readings ranged from zero (0) to 789 parts per million (ppm).

Groundwater encounter was not apparent during drilling at any of the boring locations. Upon completion of the groundwater monitor wells on January 20, 2012, groundwater was not present in any of the monitor wells. Water level measurements obtained approximately 48-hours after well installation, prior to monitor well development, ranged from about 7.4 feet bgs (MW-5) to 11.1 feet bgs (MW-3). Water level measurements obtained approximately 72-hours after well installation, after monitor well development, ranged from about 5.5 feet bgs (MW-5) to 11 feet bgs (MW-3). Water level measurements obtained on February 14, 2012 ranged from 6.07 feet bgs (MW-1) to 9.91 feet bgs (MW-4).

Partners surveyed the top-of-casing at the monitoring wells (top of inner casing) and assigned them relative elevations based on the survey using a benchmark with an assumed elevation of 100.00 feet. The relative elevations were used to obtain relative top of groundwater elevations based on the water level measurements described above.

No odors or petroleum sheen were observed in the water removed from the wells during development. Monitor well sampling field data sheets are presented in **Appendix E**.

**Table 1** presents a summary of monitor well gauging data and groundwater elevations and **Figure 6** presents the Groundwater Elevation Contour Map – February 14, 2012.

Based on groundwater elevation measurements obtained on February 14, groundwater flows generally to the north, west and south from a ridge of relatively higher elevation groundwater between MW-1 and MW-2 (**Figure 6**).

## 6.0 RESULTS OF ANALYTICAL TESTING

The results of analytical testing and cited comparison standards are presented in this section.

## 6.1 Soil Analytical Results

The results of soil analytical testing are presented in **Tables 2** and **3**, and the laboratory analytical reports are provided in **Appendix D**.

**VOCs:** Seven (7) soil samples were submitted for VOC analyses. The results of analytical testing indicate that 13 VOC analytes were detected at concentrations above the laboratory practical quantitation limits (PQLs). All detected VOCs were below their respective comparison standards. The soil VOC analytical results are summarized in **Table 2**.

**PAHs:** Seven (7) soil samples were tested for PAHs. Analytical testing indicates that 13 PAH analytes were present in the soil at concentrations above laboratory PQLs but were below their respective comparison standards in all cases. The PAH analytical results are summarized in **Table 3** and depicted on **Figure 4**.

**RCRA Metals:** Three (3) soil samples were tested for RCRA metals. The analytical results indicate that concentrations of seven (7) RCRA metals were present in the soil above the laboratory PQLs. However, the detected concentrations were below their respective comparison standards. The results of analytical testing are summarized in **Table 3**.

**TPH:** Seven (7) soil samples were tested for light fraction TPH ( $C_6$ - $C_{12}$ ) and three (3) samples were tested for middle and heavy fraction TPH ( $C_{10}$ - $C_{20}$  and  $C_{20}$ - $C_{34}$ ). Analytical results indicate that detected TPH concentrations were below applicable VAP and BUSTR comparison standards. The TPH analytical results are summarized in **Table 3**.

**PCBs:** Three (3) soil samples were tested for PCBs. Analytical results indicate that no PCBs were detected at concentrations above PQLs. The PCB analytical results are summarized in **Table 3**.

## 6.2 Groundwater Analytical Results

A summary of analytical results for the groundwater testing is presented on **Tables 4 and 5**. The laboratory analytical report is provided in **Appendix D**.

**VOCs:** The results of all groundwater analytical testing indicate that 12 VOC analytes were present in the groundwater samples at concentrations above laboratory PQLs. VOCs were not detected at MW-4 and MW-5. VOCs were detected in MW-1, MW-2 and MW-3. All detected VOCs were below their respective comparison standards with the following exceptions:

- Benzene concentrations that exceeded BUSTR Groundwater Ingestion and UPUS standards (0.005 milligrams/liter (mg/l) for both) at MW-1 (0.45 mg/l), MW-2 (0.05 mg/l) and MW-3 (0.3 mg/l).
- Naphthalene concentration that exceeded the BUSTR Groundwater Ingestion standard (0.14 mg/l) and UPUS (0.067 mg/l) at MW-3 (0.52 mg/l).
- 1,2,4-trimethylbenzene (1,2,4-TMB) concentrations that exceeded UPUS (0.14 mg/l) at MW-1 (0.26 mg/l) and MW-3 (1.2 mg/l).
- 1,3,5-trimethylbenzene (1,3,5-TMB) concentration that exceeded UPUS (0.14 mg/l) at MW-3 (0.24 mg/l).

Due to laboratory procedures and limitations, occasionally the PQL for a particular compound is higher than the comparison standard. It is therefore possible, but unlikely, that the compound is present in a sample at a concentration below the PQL, but above the comparison standard.

For groundwater samples tested from MW-1 through MW-5, three (3) VOCs (1,2-dibromo-3-chloropropane, 1,2-dibromoethane, and 1,2,3-trichloropropane) were not detected above PQLs; however, the PQLs were above the UPUS for all groundwater samples. The UPUS for 1,2-dibromo-3-chloropropane (0.0002 mg/l), 1,2-dibromoethane (0.00005 mg/l), and 1,2,3-trichloropropane (0.00022

mg/l) are very low. It is therefore possible, but unlikely, that these analytes may be present below the PQL concentration and above UPUS. However, the compounds 1,2-dibromo-3-chloropropane and 1,2-dibromoethane are pesticide fumigants, and 1,2,3-trichloropropane is a degreaser and is used in the production of pesticides. Based on this, there is no evidence to suggest that the Property would have been impacted by these compounds.

Additionally, for the groundwater tested from MW-3, the PQLs for 12 VOC analytes, including carbon tetrachloride, chlorodibromomethane, chloroform, 1,2-dichloroethane, 1,1-dichloroethene, 1,2-dichloropropane, cis-1,3-dichloropropene, 1,1,2,2-tetrachloroethane, tetrachloroethene, 1,1,2-trichloroethane, trichloroethene, and vinyl chloride were above UPUS. The PQLs were elevated due to the sample dilution factor utilized for the sample from MW-3. However, based on the results of analytical testing of other groundwater samples and the known historical use of the Property, there is no evidence to suggest that the Property would have been impacted by these compounds.

The results of the groundwater VOC analyses are presented in Table 4.

**PAHs:** The results of all groundwater analytical testing indicate that 12 PAH analytes were present in the groundwater samples at concentrations above the laboratory PQLs. No detected PAH analytes were present at concentrations exceeding their respective VAP UPUS and BUSTR groundwater ingestion standards.

The PQLs for all COCs were below the comparison standards, except for dibenz(a,h)anthracene. This compound was not detected above PQLs in any of the groundwater samples; however, the PQLs were above UPUS. It is therefore possible, but unlikely, that this analyte may be present below the PQL concentration and above the applicable UPUS.

The results of the groundwater PAH analyses are presented in **Table 5**.

## 6.3 Sub-Slab Soil Vapor and Soil Gas Analytical Results

A summary of analytical results for the sub-slab soil vapor and soil gas testing is presented on **Table 6**. The laboratory analytical report is provided in **Appendix D**.

Results of sub-slab soil vapor and soil gas analysis indicated that 18 VOC compounds were present in the samples at concentrations above PQLs. Comparison of the detected concentrations to the OSWER Residential Screening Levels (with the applied attenuation factor) revealed no exceedences with the exception of dichlorodifluoromethane (Freon 12) in the sub-slab soil vapor samples obtained from SV-1 and SV-2. The dichlorodifluoromethane concentration was further compared to the indoor air standards developed for commercial land use using USEPA RAGS (2009) which showed the standard for dichlorodifluoromethane (8,850  $\mu$ g/m³) to be exceeded in SV-1 (39,000  $\mu$ g/m³ and 16,000  $\mu$ g/m³).

Of the 18 VOC compounds detected in the sub-slab soil vapor/soil gas samples, ethanol and dichlorodifluoromethane were also detected in the Background ambient air sample. The concentrations of these VOCs in the Background sample were orders of magnitude lower than the respective concentrations present in the soil vapor/soil gas samples. All detected concentrations in the Background sample were below their respective cited standards.

The results of the sub-slab/soil gas VOC analyses are presented in Table 6.

#### 7.0 LIMITATIONS

The analytical results and conclusions presented in this letter report are based on the installation of nine (9) soil borings, five (5) monitoring wells, five (5) sub-slab/soil/background vapor points, and limited soil, groundwater and vapor analyses. Although the results presented above provide a reasonable indication of subsurface conditions in the areas evaluated, they may not be indicative of soil or groundwater conditions in areas of the Property not evaluated by Partners.

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the Limited Phase II Site Investigation activities described in this report, the following conclusions and recommendations are provided:

- The results of soil analytical testing indicate that the soil has not been impacted by VOCs, PAHs, RCRA Metals, TPH, or PCBs at levels above cited BUSTR or VAP comparison standards.
- The results of groundwater analytical testing indicate that VOCs were present in the groundwater at concentrations above cited BUSTR and/or VAP groundwater ingestion comparison standards. Based on this, it appears that groundwater beneath the Property has been adversely impacted by VOCs used during historic filling station activities that occurred on Property. However, the Property is located within a USD where groundwater ingestion is prohibited. Therefore, the groundwater ingestion standards are used for comparison purposes only and would not apply to the Property.
- The results of sub-slab soil vapor and soil gas analytical testing indicate that the subsurface has been impacted by VOCs, with concentrations of dichlorodifluoromethane (Freon 12) in the sub-slab soil vapor samples exceeding cited standards. Concentrations of Freon 12 in the soil gas samples obtained from sample points outside the existing building were orders of magnitude lower, indicating that the area exceeding comparison standards is confined to the sub-slab soil vapors beneath the concrete floor of the existing building. It is likely that the source of the Freon 12 vapors beneath the building slab was from refrigerant contained in the freezers and refrigerators that were previously located in the former restaurant.

Based on the findings of this report, residual petroleum and VOC contamination was detected in the soil, groundwater, and sub-slab soil vapor/soil gas beneath the Property. However, based on the results of sub-slab/soil gas testing, it does not appear that the residual petroleum/VOC concentrations in soil and groundwater pose an apparent concern for the indoor air exposure pathway on the Property, except for dichlorodifluoromethane. It is likely that, during demolition activities in preparation for Property redevelopment, the concentrations of dichlorodifluoromethane in the sub-slab soil vapor will dissipate once the concrete slab associated with the existing building is removed and the sub-base is exposed.

#### 9.0 CLOSING

Thank you for the opportunity to serve your needs. Please call us at (440) 248-6005 if you have any questions or if we can be of any further assistance.

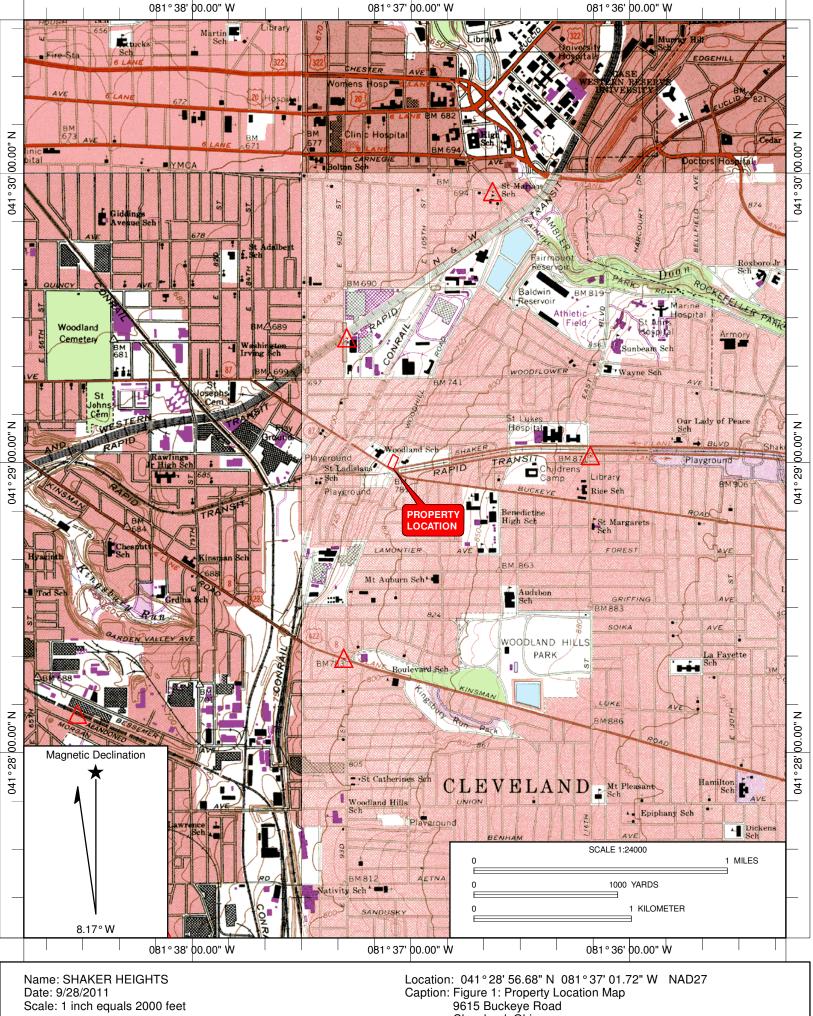
Sincerely.

Partners Environmental Consulting, Inc.

Thomas A. Weir Environmental Scientist

John T. Garvey, CPG
Director of Brownfield Operations

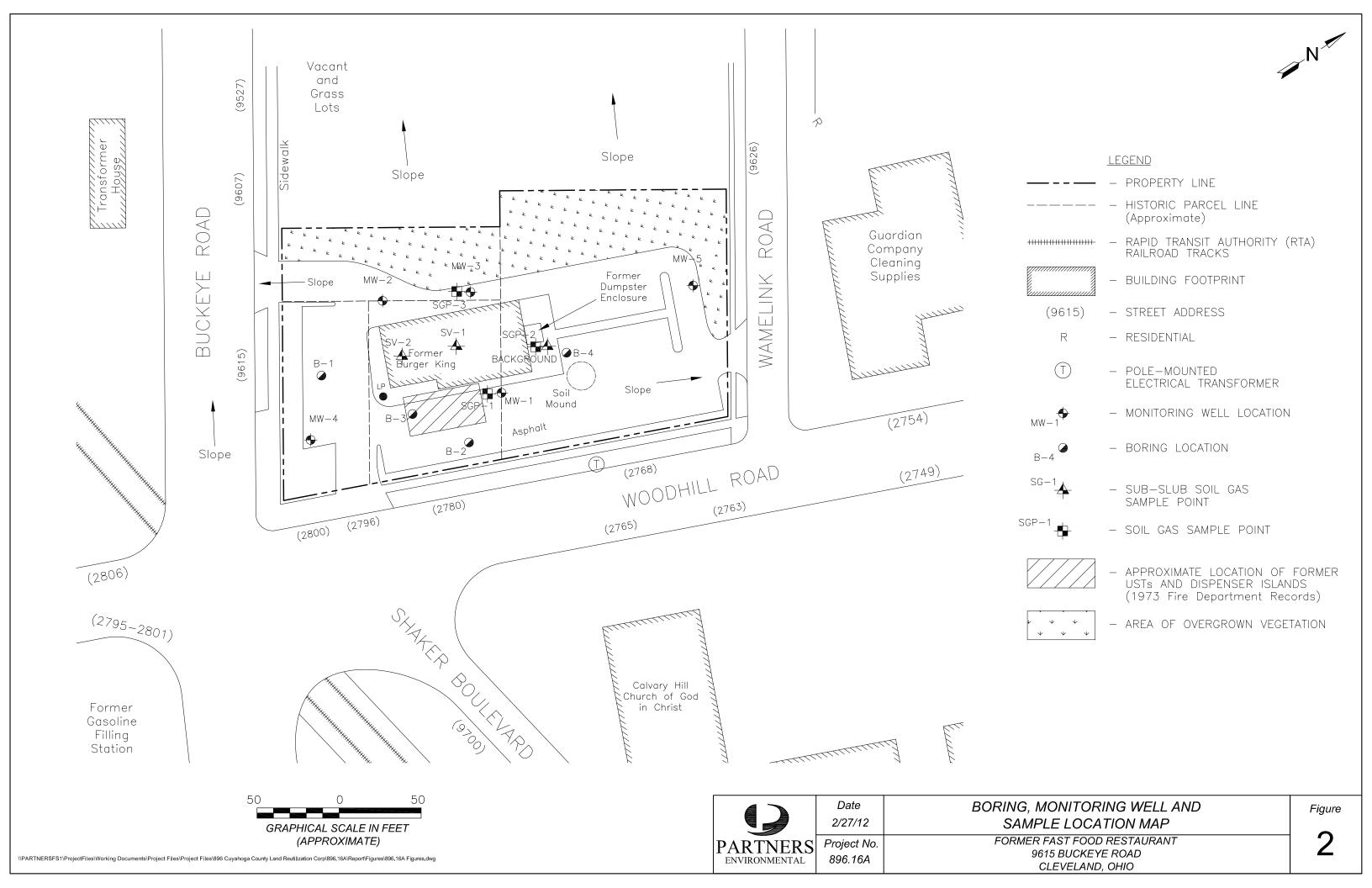
## **FIGURES**



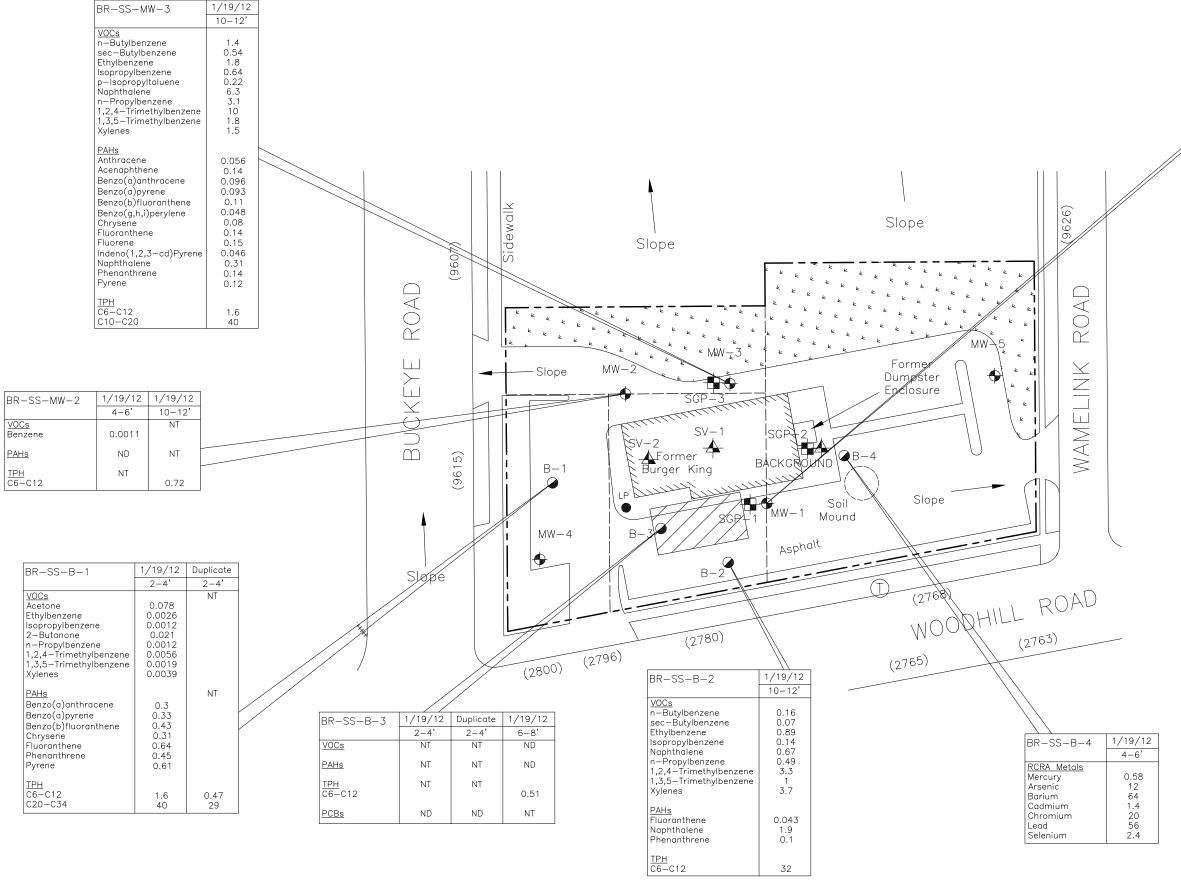
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Cleveland, Ohio







	BR-SS-MW-1	1/19/12	1/19/12	Duplicate	1/19/12	Duplicate
		0-2'	2-4'	2-4'	10-12'	10-12'
//	VOCs Benzene n-Butylbenzene sec-Butylbenzene Ethylbenzene Isopropylbenzene Naphthalene n-Propylbenzene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene Xylenes	NT	NT	NT	2 0.54 <0.30 3.7 0.75 3 2.6 7.1 0.71	2.3 1.2 0.45 7.3 0.95 7.3 3.7 44 3.4
	RCRA Metals Arsenic Barium Cadmium Chromium Lead Selenium	NT	9.1 41 0.52 13 10 2.2	11 51 0.46 20 15 3.1	NT	NT
	<u>PAHs</u> Napthalene Phenanthrene	NT	NT	NT	2.3 0.047	2.5 0.062
	TPH C6-C12 C10-C20 C20-C34	NT	NT	NT	71 81 7.4	NT
	<u>PCBs</u>	ND	NT	NT	NT	NT

## **LEGEND**

— – – — PROPERTY LINE

++++ - RAPID TRANSIT AUTHORITY (RTA)
RAILROAD TRACKS

BUILDING FOOTPRINT

(9615) - STREET ADDRESS

) — POLE-MOUNTED ELECTRICAL TRANSFORMER

MW-1 - MONITORING WELL LOCATION

BORING LOCATION

SG-1 - SUB-SLUB SOIL GAS SAMPLE POINT

- APPROXIMATE LOCATION OF FORMER
USTS AND DISPENSER ISLANDS
(1973 Fire Department Records)

\* \* - AREA OF OVERGROWN VEGETATION

## <u>NOTES</u>

- 1. All values are in mg/kg.
- 2. VOCs = Volatile Organic Compounds
- 3. PAHs = Polynuclear Aromatic hydrocarbons
- 4. TPH = Total Petroleum Hydrcarbons
- 5. NT = not tested
- 6. ND = non-detect

	Date
	2/27/12
PARTNERS	Project No.
ENVIRONMENTAL	896.16A

DISTRIBUTION OF COCs IN SOIL MAP

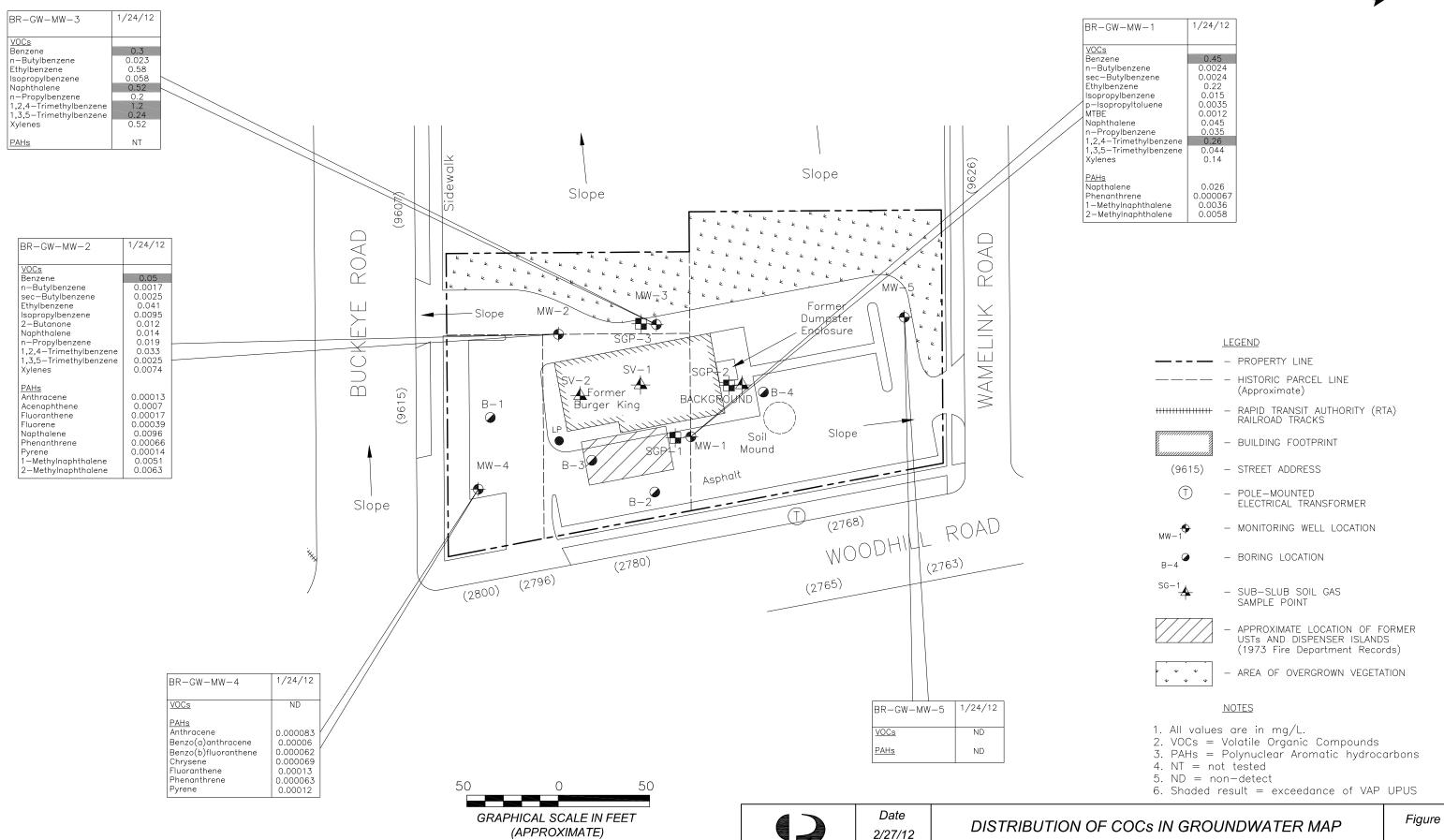
FORMER FAST FOOD RESTAURANT 9615 BUCKEYE ROAD CLEVELAND, OHIO Figure

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GRAPHICAL SCALE IN FEET (APPROXIMATE)

3





PARTNERS

Project No.

896.16A

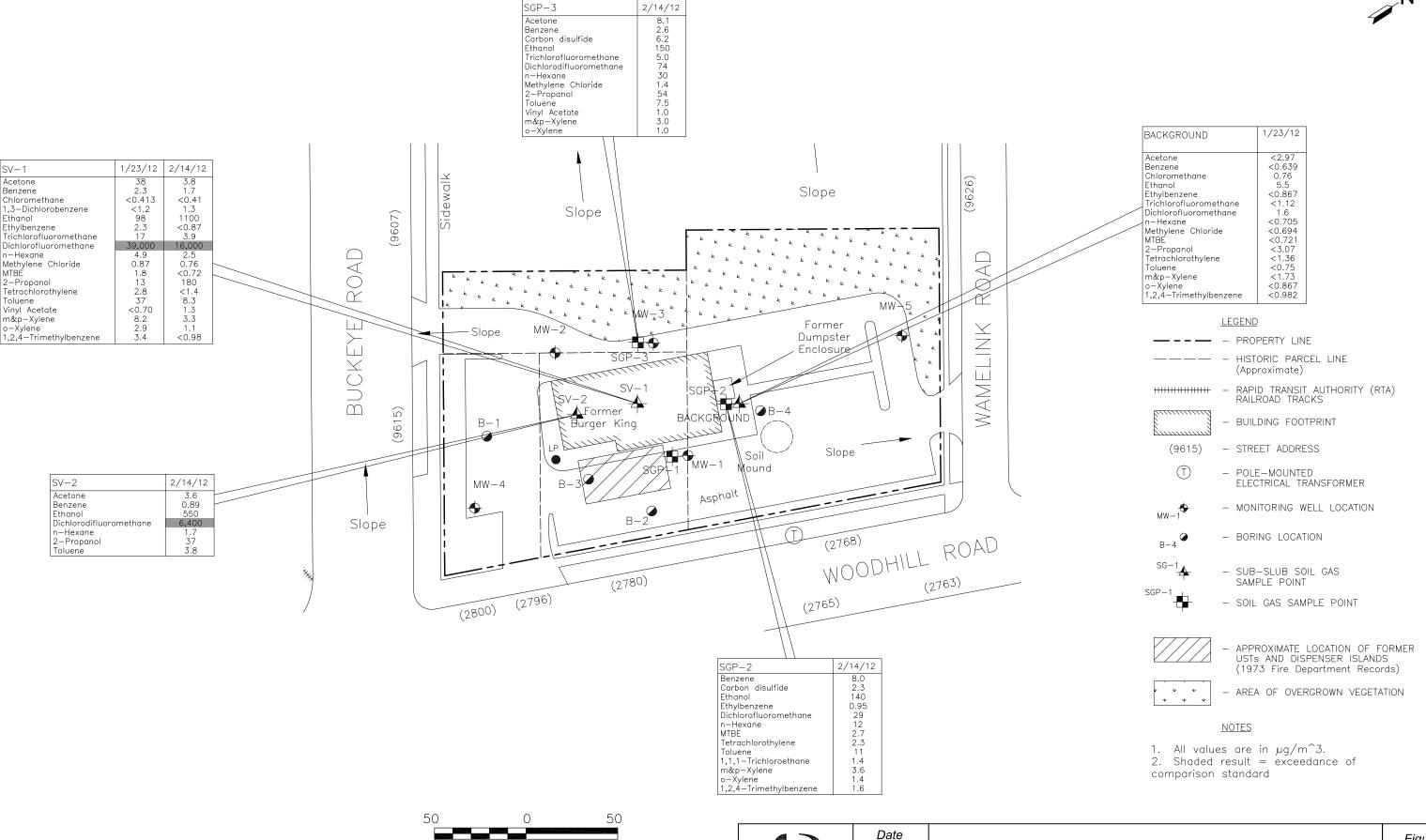
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FORMER FAST FOOD RESTAURANT

9615 BUCKEYE ROAD

CLEVELAND, OHIO





GRAPHICAL SCALE IN FEET

(APPROXIMATE)

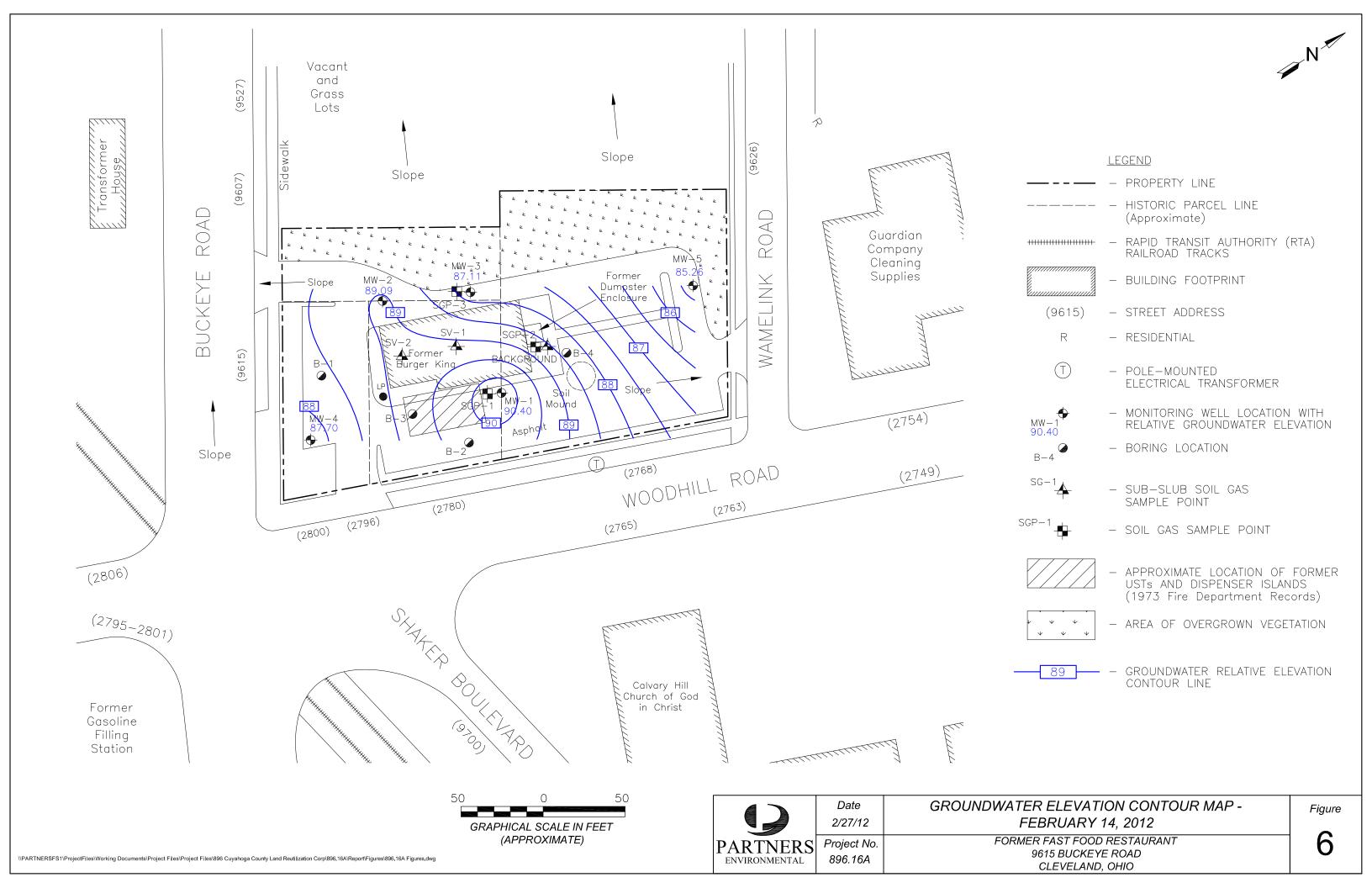
PARTNERS Project No. 896.16A

2/27/12

DISTRIBUTION OF COCs IN SOIL VAPOR MAP

FORMER FAST FOOD RESTAURANT 9615 BUCKEYE ROAD CLEVELAND, OHIO

Figure



## **TABLES**

Table 1
Groundwater Monitoring Well Information and Elevations
Former Fast Food Restaurant
Cleveland, Ohio

Well ID	Depth of Well	Top of Well Casing <sup>1</sup>	Date	Depth to Groundwater (feet)	Groundwater Elevation <sup>1</sup>
			1/23/2012	10.61	85.86
MW-1	10.80	96.47	1/24/2012	8.09	88.38
			2/14/2012	6.07	90.40
			1/23/2012	9.47	86.96
MW-2	11.95	96.43	1/24/2012	7.72	88.71
			2/14/2012	7.34	89.09
			1/23/2012	11.09	86.10
MW-3	11.73	97.19	1/24/2012	11.03	86.16
			2/14/2012	9.48	87.71
			1/23/2012	9.59	88.02
MW-4	10.65	97.61	1/24/2012	9.91	87.70
			2/14/2012	9.91	87.70
			1/23/2012	7.43	85.88
MW-5	11.69	93.31	1/24/2012	5.52	87.79
			2/14/2012	8.05	85.26

## Notes:

1) Elevations shown are relative to a benchmark with an assumed elevation of 100.00 feet. Survey data provided by Partners.

Table 2 Summary of VOCs in Soil Former Fast Food Restaurant Cleveland, Ohio

Cleveland, Ohio						1								
Sample ID (Depth <sup>1</sup> )								BR-SS-B-1 (2-4 FT)	BR-SS-B-2 (10-12 FT)	BR-SS-B-3 (6-8 FT)	BR-SS-MW-1 (10-12 FT)	BR-SS-MW-1 DUPLICATE (10-12 FT)	BR-SS-MW-2 (4-6 FT)	BR-SS-MW-3 (10-12 FT)
Collection Date		Direct Contact Non-	Direct Contact Excavation	Soil to Indoor Air Non-	Soil to Non- Drinking Water	GDCS Commercial &	GDCS Construction &	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012
Parameter	Units <sup>2</sup>	Residential <sup>3</sup>	Worker <sup>3</sup>	Residential 4	Leaching <sup>4</sup>	Industrial Land Use <sup>6</sup>	Excavation Activities <sup>7</sup>	Value	Value	Value	Value	Value	Value	Value
Acetone	mg/kg	NE	NE	NE	NE	100,000	100,000	0.078	<2.7	<0.058	<15.	<5.6	< 0.056	<6.2
Acrylonitrile	mg/kg	NE	NE	NE	NE	16	14	< 0.011	< 0.54	< 0.012	<3.0	<1.1	< 0.011	<1.2
Benzene	mg/kg	100	310	6.50	12.80	140	150	<0.0011	< 0.054	<0.0012	2	2.3	0.0011	<0.12
Bromobenzene	mg/kg	NE	NE	NE	NE	NE	NE	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
Bromodichloromethane	mg/kg	NE	NE	NE	NE	NE	NE	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
Bromoform		NE	NE	NE NE	NE	NE NE	NE	<0.0011	<0.054	<0.0012		<0.11	<0.0011	<0.12
	mg/kg										<0.30			
Bromomethane	mg/kg	NE	NE	NE	NE	NE	NE	<0.0055	<0.27	<0.0058	<1.5	<0.56	<0.0056	<0.62
n-Butylbenzene	mg/kg	NE	NE	NE	NE	178 9	178 9	<0.0011	0.16	<0.0012	0.54	1.2	<0.0011	1.4
sec-Butylbenzene	mg/kg	NE	NE	NE	NE	764 <sup>9</sup>	764 <sup>9</sup>	< 0.0011	0.07	<0.0012	< 0.30	0.45	<0.0011	0.54
tert-Butylbenzene	mg/kg	NE	NE	NE	NE	215 <sup>9</sup>	215 <sup>9</sup>	< 0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
Carbon tetrachloride	mg/kg	NE	NE	NE	NE	8.2	24	< 0.0011	< 0.054	< 0.0012	< 0.30	<0.11	< 0.0011	<0.12
Chlorobenzene	mg/kg	NE	NE	NE	NE	710	740	< 0.0011	< 0.054	< 0.0012	< 0.30	<0.11	< 0.0011	<0.12
Chlorodibromomethane	mg/kg	NE	NE	NE	NE	1,600	1,600	< 0.0011	< 0.054	< 0.0012	< 0.30	<0.11	< 0.0011	<0.12
Chloroethane	mg/kg	NE	NE	NE	NE	2,200	2,200	< 0.0055	<0.27	<0.0058	<1.5	< 0.56	< 0.0056	<0.62
2-Chloroethyl vinyl ether	mg/kg	NE	NE	NE	NE	NE	NE	< 0.055	<2.7	<0.058	<15.	<5.6	<0.056	<6.2
Chloroform	mg/kg	NE	NE	NE	NE	14	55	<0.0055	<0.27	<0.0058	<1.5	<0.56	<0.0056	<0.62
Chloromethane	mg/kg	NE	NE	NE NE	NE	NE NE	NE NE	<0.0027	<0.13	<0.0038	<0.74	<0.28	<0.0038	<0.31
2-Chlorotoluene		NE NE	NE NE	NE NE	NE NE	NE NE	NE NE		<0.13		<0.74		<0.0028	
	mg/kg			1				<0.0011		<0.0012		<0.11		<0.12
4-Chlorotoluene	mg/kg	NE	NE	NE	NE	230 9	230 9	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
1,2-Dibromo-3-Chloropropane	mg/kg	NE	NE	NE	NE	NE	NE	<0.0055	<0.27	<0.0058	<1.5	<0.56	<0.0056	<0.62
1,2-Dibromoethane	mg/kg	NE	NE	NE	NE	NE	NE	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
Dibromomethane	mg/kg	NE	NE	NE	NE	NE	NE	< 0.0011	< 0.054	<0.0012	<0.30	<0.11	< 0.0011	<0.12
1,2-Dichlorobenzene	mg/kg	NE	NE	NE	NE	370	370	< 0.0011	< 0.054	< 0.0012	< 0.30	< 0.11	< 0.0011	<0.12
1,3-Dichlorobenzene	mg/kg	NE	NE	NE	NE	NE	NE	< 0.0011	< 0.054	< 0.0012	< 0.30	<0.11	< 0.0011	<0.12
1,4-Dichlorobenzene	mg/kg	NE	NE	NE	NE	130	510	< 0.0011	< 0.054	< 0.0012	<0.30	<0.11	< 0.0011	<0.12
Dichlorodifluoromethane	mg/kg	NE	NE	NE	NE	520	1,400	< 0.0055	< 0.27	< 0.0058	<1.5	<0.56	< 0.0056	< 0.62
1.1-Dichloroethane	mg/kg	NE	NE	NE	NE	2,300	2,300	< 0.0011	< 0.054	<0.0012	< 0.30	<0.11	< 0.0011	<0.12
1,2-Dichloroethane	mg/kg	NE	NE	NE	NE	19	75	<0.0011	< 0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
1,1-Dichloroethene	mg/kg	NE	NE	NE	NE	610	180	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
cis-1.2-Dichloroethene	mg/kg	NE	NE	NE	NE	2,200	2,200	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
trans-1,2-Dichloroethene		NE	NE	NE NE	NE	260	78	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
	mg/kg													
1,2-Dichloropropane	mg/kg	NE	NE	NE	NE	31	30	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
1,1-Dichloropropene	mg/kg	NE	NE	NE	NE	NE	NE	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
1,3-Dichloropropane	mg/kg	NE	NE	NE	NE	NE	NE	< 0.0011	< 0.054	<0.0012	< 0.30	<0.11	<0.0011	<0.12
cis-1,3-Dichloropropene	mg/kg	NE	NE	NE	NE	NE	NE	< 0.0011	<0.054	<0.0012	<0.30	<0.11	< 0.0011	<0.12
trans-1,3-Dichloropropene	mg/kg	NE	NE	NE	NE	NE	NE	< 0.0011	< 0.054	< 0.0012	< 0.30	<0.11	< 0.0011	<0.12
2,2-Dichloropropane	mg/kg	NE	NE	NE	NE	NE	NE	< 0.0011	< 0.054	< 0.0012	< 0.30	<0.11	< 0.0011	<0.12
Di-isopropyl ether	mg/kg	NE	NE	NE	NE	NE	NE	< 0.0011	< 0.054	< 0.0012	< 0.30	<0.11	< 0.0011	<0.12
Ethylbenzene	mg/kg	17,000	160,000	3,230	2,480	230	230	0.0026	0.89	< 0.0012	3.7	7.3	< 0.0011	1.8
Hexachloro-1,3-butadiene	mg/kg	NE	NE	NE	NE	220	170	< 0.0011	< 0.054	< 0.0012	< 0.30	<0.11	< 0.0011	<0.12
n-Hexane	mg/kg	NE	NE	NE	NE	190	190	<0.011	<0.54	<0.012	<3.0	<1.1	<0.011	<1.2
Isopropylbenzene	mg/kg	NE	NE	NE	NE	260	260	0.0012	0.14	<0.0012	0.75	0.95	<0.0011	0.64
p-Isopropyltoluene		NE NE	NE	NE NE	NE			<0.0012	<0.054	<0.0012	<0.30	<0.11	<0.0011	0.22
	mg/kg	NE NE	NE NE	NE NE	NE NE	573 <sup>9</sup> 100,000	573 °							
2-Butanone (MEK)	mg/kg						15,000	0.021	<0.54	<0.012	<3.0	<1.1	<0.011	<1.2
Methylene Chloride	mg/kg	NE	NE	NE	NE	570	1,500	<0.0055	<0.27	<0.0058	<1.5	<0.56	<0.0056	<0.62
4-Methyl-2-pentanone (MIBK)	mg/kg	NE	NE	NE	NE	16,000	12,000	<0.011	<0.54	<0.012	<3.0	<1.1	<0.011	<1.2
Methyl tert-butyl ether	mg/kg	57,000	57,000	20,200	14,600	1,900	6,700	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
Naphthalene	mg/kg	530	1,900	877	632	150	84	<0.0055	0.67	<0.0058	3	7.3	<0.0056	6.3
n-Propylbenzene	mg/kg	NE	NE	NE	NE	236 <sup>9</sup>	236 <sup>9</sup>	0.0012	0.49	<0.0012	2.6	3.7	<0.0011	3.1
Styrene	mg/kg	NE	NE	NE	NE	1,700	1,700	<0.0011	<0.054	<0.0012	< 0.30	<0.11	<0.0011	<0.12
1,1,1,2-Tetrachloroethane	mg/kg	NE	NE	NE	NE	81	310	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
1,1,2,2-Tetrachloroethane	mg/kg	NE	NE	NE	NE	24	94	< 0.0011	< 0.054	<0.0012	<0.30	<0.11	< 0.0011	<0.12
Tetrachloroethene	mg/kg	NE	NE	NE	NE	53	220	< 0.0011	< 0.054	<0.0012	<0.30	<0.11	< 0.0011	<0.12
Toluene	mg/kg	5,900	24,000	994	760	520	520	<0.0055	<0.27	<0.0058	<1.5	<0.56	<0.0056	<0.62
1,2,3-Trichlorobenzene	mg/kg	NE	NE	NE NE	NE	NE NE	NE NE	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0030	<0.12
1,2,4-Trichlorobenzene		NE NE	NE NE	NE NE	NE NE	NE NE	NE NE	<0.0011	<0.054		<0.30	<0.11		<0.12
	mg/kg									<0.0012			<0.0011	
1,1,1-Trichloroethane	mg/kg	NE	NE	NE	NE	1,300	1,300	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
1,1,2-Trichloroethane	mg/kg	NE	NE	NE	NE	55	210	<0.0011	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
Trichloroethene	mg/kg	NE	NE	NE	NE	150	NE	< 0.0011	<0.054	<0.0012	< 0.30	<0.11	<0.0011	<0.12
Trichlorofluoromethane	mg/kg	NE	NE	NE	NE	1,600	1,600	< 0.0055	<0.27	<0.0058	<1.5	<0.56	<0.0056	<0.62
1,2,3-Trichloropropane	mg/kg	NE	NE	NE	NE	28 <sup>9</sup>	190 <sup>9</sup>	<0.0027	<0.13	<0.0029	<0.74	<0.28	<0.0028	<0.31
1,2,4-Trimethylbenzene	mg/kg	NE	NE	NE	NE	120	35	0.0056	3.3	<0.0012	7.1	44	<0.0011	10
1,3,5-Trimethylbenzene	mg/kg	NE	NE	NE	NE	95	200	0.0019	1	<0.0012	0.71	3.4	<0.0011	1.8
Vinyl chloride	mg/kg	NE	NE	NE	NE	12	48	<0.0013	<0.054	<0.0012	<0.30	<0.11	<0.0011	<0.12
Xylenes, Total				254	194	370	370	0.0039						
	mg/kg	6,400	7,000	∠54	194	3/0	570	0.0039	3.7	<0.0035	1	4.3	<0.0034	1.5
Notes														

## Notes 1. ft - Feet below grade

- 2. mg/kg = Milligrams per kilogram parts per million (ppm)
- 3. Ohio Bureau of Underground Storage Tank Regulations (BUSTR), OAC 1301:7-9-13(J)(3)(d) Action Levels in Soil for the Direct Contact with Soil Pathway.
- 4. Ohio Bureau of Underground Storage Tank Regulations (BUSTR), OAC 1301:7-9-13.[J](3)(f) Action Levels in Soil for the Soil to Indoor Air, Soil to Outdoor Air, Soil to Drinking Water Leaching, and Soil to Non-Drinking Water Leaching. 5. Comparison standards determined by Ohio Voluntary Action Program (VAP), OAC 3745-300-08(C)(3)(b) - Generic Direct Contact Soil Standards for Carcinogenic and Non-carcinogenic Chemicals of Concern - Residential Land Use Category.
- 6. Comparison standards determined by Ohio Voluntary Action Program (VAP), OAC 3745-300-08(C)(3)(c) Generic Direct Contact Soil Standards for Carcinogenic and Non-carcinogenic Chemicals of Concern Commercial and Industrial Land Use Categories.
- 7. Comparison standards determined by Ohio Voluntary Action Program (VAP), OAC 3745-300-08(C)(3)(d) Generic Direct Contact Soil Standards for Carcinogenic and Non-carcinogenic Chemicals of Concern Construction and Excavation Activities Category.
- 8. NE: Not Established (No Regulatory Limits Under the VAP Have Been Established for the Specific Compound).
- 9. Supplemental standards from the Ohio EPA Voluntary Action Program Chemical Information Database and Applicable Regulatory Standards (CIDARS).

**Bolded** numbers indicate a concentration above laboratory detection limits.

Bold and shaded numbers indicate a detected concentration above a comparison standard.

Table 3 Summary of PAHs, RCRA Metals, TPH, and PCBs in Soil Former Fast Food Restaurant Lakewood, Ohio

Lakewood, Onio						I		BR-SS-B-1	BR-SS-B-1	BR-SS-B-2	BR-SS-B-3	BR-SS-B-3	BR-SS-B-3	BR-SS-B-4	BR-SS-MW-1	BR-SS-MW-1	BR-SS-MW-1	BR-SS-MW-1	BR-SS-MW-1	BR-SS-MW-2	BR-SS-MW-2	BR-SS-MW-3
Sample ID (Depth <sup>1</sup> )								(2-4 FT)	DUPLICATE (2-4 FT)	(10-12 FT)	(2-4 FT)	DUPLICATE (2-4 FT)	(6-8 FT)	(4-6 FT)	(0-2 FT)	(2-4 FT)	DUPLICATE (2-4 FT)	(10-12 FT)	DUPLICATE (10-12 FT)	(4-6 FT)	(10-12 FT)	(10-12 FT)
Collection Date		Direct Contact	Direct Contact Excavation	Soil to Indoor Air Non-	Soil to Non- Drinking Water	GDCS Commercial &	GDCS Construction &	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012	1/19/2012
Parameter	Units <sup>2</sup>	Non-Residential <sup>3</sup>	Worker <sup>3</sup>	Residential 4	Leaching 4	Industrial Land Use <sup>6</sup>	Excavation Activities <sup>7</sup>	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
Polynuclear Aromatic Hydrocarl	ons-PAHs																					
Anthracene	mg/kg	NE	NE	NE	NE	280,000	1,000,000	<0.18	-	< 0.035	-	-	<0.038	-	-	-	-	<0.039	< 0.037	< 0.037	-	0.056
Acenaphthene	mg/kg	NE	NE	NE	NE	56,000	440,000	<0.18	-	< 0.035	-	-	<0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	0.14
Acenaphthylene	mg/kg	NE	NE	NE	NE	56,000 <sup>8</sup>	44,000 <sup>8</sup>	<0.18	-	< 0.035	-	-	< 0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	< 0.041
Benzo(a)anthracene	mg/kg	63	810	>1E+6	>1E+6	76	680	0.3	-	< 0.035	-	-	<0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	0.096
Benzo(a)pyrene	mg/kg	6.3	81	>1E+6	>1E+6	7.7	69	0.33	-	< 0.035	-	-	< 0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	0.093
Benzo(b)fluoranthene	mg/kg	63	810	>1E+6	>1E+6	77	690	0.43	-	< 0.035	-	-	< 0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	0.11
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	28,000 <sup>8</sup>	220,000 <sup>8</sup>	<0.18	-	< 0.035	-	-	< 0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	0.048
Benzo(k)fluoranthene	mg/kg	630	8,100	>1E+6	>1E+6	770	6,900	<0.18	-	< 0.035	-	-	< 0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	< 0.041
Chrysene	mg/kg	6,700	41,000	>1E+6	>1E+6	7,600	69,000	0.31	-	< 0.035	-	-	< 0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	0.08
Dibenz(a,h)anthracene	mg/kg	6.7	41	>1E+6	>1E+6	7.7	69	<0.18	-	< 0.035	-	-	< 0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	< 0.041
Fluoranthene	mg/kg	NE	NE	NE	NE	37,000	290,000	0.64	-	< 0.035	-	-	<0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	0.14
Fluorene	mg/kg	NE	NE	NE	NE	37,000	290,000	<0.18	-	0.043	-	-	< 0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	0.15
Indeno(1,2,3-cd)pyrene	mg/kg	67	410	>1E+6	>1E+6	77	690	<0.18	-	< 0.035	-	-	<0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	0.046
Naphthalene	mg/kg	530	1,900	877	632.00	150	84	<0.18	-	1.9	-	-	< 0.038	-	-	-	-	2.3	2.5	< 0.037	-	0.31
Phenanthrene	mg/kg	NE	NE	NE	NE	280,000 8	2,200,000 8	0.45	-	0.1	-	-	< 0.038	-	-	-	-	0.047	0.062	< 0.037	-	0.14
Pyrene	mg/kg	NE	NE	NE	NE	28,000	220,000	0.61	-	< 0.035	-	-	< 0.038	-	-	-	-	< 0.039	< 0.037	< 0.037	-	0.12
RCRA Metals																				•	-	
Mercury	mg/kg	NE	NE	NE	NE	290	190	-	-	-	-	-	-	0.58	-	< 0.022	<0.022	-	-	-	-	-
Arsenic	mg/kg	NE	NE	NE	NE	82	420	-	-	-	-	-	-	12	-	9.1	11	-	-	-	-	-
Barium	mg/kg	NE	NE	NE	NE	370,000	120,000	-	-	-	-	-	-	64	-	41	51	-	-	-	-	-
Cadmium	mg/kg	NE	NE	NE	NE	2,300	1,600	-	-	-	-	-	-	1.4	-	0.52	0.46	-	-	-	-	-
Chromium	mg/kg	NE	NE	NE	NE	7,900	13,000	-	-	-	-	-	-	20	-	13	20	-	-	-	-	-
Lead	mg/kg	NE	NE	NE	NE	1,800 9	750 <sup>9</sup>	-	-	-	-	-	-	56	-	10	15	-	-	-	-	-
Selenium	mg/kg	NE	NE	NE	NE	15,000	9,700	-	-	-	-	-	-	2.4	-	2.2	3.1	-	-	-	-	-
Silver	mg/kg	NE	NE	NE	NE	15,000	9,700	-	-	-	-	-	-	< 0.59	-	< 0.55	< 0.56	-	-	-	-	-
Total Petroleum Hydrocarbons-	PH 3																			•	-	
TPH C6 - C12	mg/kg							1.6	0.47	32	-	-	0.51	-	-	-	-	71	-	-	0.72	200
TPH C10-C20	mg/kg							<22.	<23	-	-	-	-	-	-	-	-	81	-	-	-	17
TPH C20-C34	mg/kg							40	29	-	-	-	-	-	-	-	-	7.4	-	-	-	<4.9
Polychlorinated Biphenyls-Po	Bs							•	•	•		•	•	•	•	•		•				
PCB 1016	mg/kg							-	-	-	< 0.019	<0.020	-	-	<0.020	-	-	-	-	-	-	-
PCB 1221	mg/kg						1	_	-	_	<0.019	<0.020	-		<0.020	-	-	-	-	-	-	-
PCB 1232	mg/kg						1	-	-	-	<0.019	<0.020	-		<0.020	-	-	-	-	-	-	-
PCB 1242	mg/kg	NE	NE	NE	NE	18	42	_	-	_	<0.019	<0.020	-		<0.020	-	-	-	-	-	-	-
PCB 1248	mg/kg					-		_	-	_	<0.019	<0.020	-		<0.020	-	-	-	-	-	-	-
PCB 1254	mg/kg						1	_	-	_	<0.019	<0.020	-	-	<0.020	-	-	-	-	-	-	-
PCB 1260	mg/kg							-	-	-	<0.019	<0.020	-	-	<0.020	-	-	-	-	-	-	<u> </u>
Notes	mg/ng	l .	l .	ı	ı	U			ı		10.0.0	10.020		L	10.020	ı	I.	1		1		

#### Notes

- FT Feet below grade
- 2. mg/kg = Milligrams per kilogram parts per million (ppm)
- 3. Ohio Bureau of Underground Storage Tank Regulations (BUSTR), OAC 1301:7-9-13(J)(3)(d) Action Levels in Soil for the Direct Contact with Soil Pathway
- 4. Ohio Bureau of Underground Storage Tank Regulations (BUSTR), OAC 1301:7-9-13(J)(3)(f) Action Levels in Soil to Indoor Air, Soil to Outdoor Air, Soil to Drinking Water Leaching, and Soil to Non-Drinking Water Leaching Pathway, Soil Class 1
- 5. Comparison standards determined by Ohio Voluntary Action Program (VAP), OAC 3745-300-08(C)(3)(b) Generic Direct Contact Soil Standards for Carcinogenic Annual Soil Standards for Carcinogenic Chemicals of Concern Residential Land Use Category.
- $6. \ \ Comparison \ standards \ determined \ by \ Ohio \ Voluntary \ Action \ Program \ (VAP), \ OAC \ 3745-300-08(C)(3)(c) Generic \ Direct \ Contact \ Soil \ Standards \ for \ Carcinogenic \ and \ Non-carcinogenic \ Chemicals \ of \ Concern Commercial \ and \ Industrial \ Land \ Use \ Categories.$
- 7. Comparison standards determined by Ohio Voluntary Action Program (VAP), OAC 3745-300-08(C)(3)(d) Generic Direct Contact Soil Standards for Carcinogenic and Non-carcinogenic Chemicals of Concern Construction and Excavation Activities Category.
- $8. \ Supplemental \ standards \ from \ the \ Ohio \ EPA \ Voluntary \ Action \ Program \ Chemical \ Information \ Database \ and \ Applicable \ Regulatory \ Standards \ (CIDARS).$
- Ohio EPA Voluntary Action Program (VAP) Generic Direct Contact Standards (GDCS) for Lead, OAC 3745-300-08 (C)(3)(f).
   NE = Not Established (No Regulatory Limits Under the VAP Have Been Established for the Specific Compound).
- 11. TPH Action Levels defined in OAC 1301: 7-9-13, as required by OAC 3745-300-08(B)(3), Sand and Gravel, Unknown Soil Type.
- = Sample not tested for the analytical method.

**Bold** numbers indicate a concentration above laboratory detection limits.

Bold and shaded numbers indicate a detected concentration above a comparison standard.

Table 4 Summary of VOCs in Groundwater Former Fast Food Restaurant Cleveland, Ohio

Collect Date     Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Collect Date   Co	Cleveland, Ohio										
Parameter   Umba	Sample ID					VAP Standard	BR-GW-MW-1	BR-GW-MW-2	BR-GW-MW-3	BR-GW-MW-4	BR-GW-MW-5
Parameter	Collect Date					UDUC4	1/24/2012	1/24/2012	1/24/2012	1/24/2012	1/24/2012
Auchone mgl Ng	Parameter	Units <sup>1</sup>	Ingestion 2			UPUS	Value	Value	Value	Value	Value
According mgb MC	Acetone	ma/l	NE <sup>5</sup>			14	<0.050	<0.050	<1.0	< 0.050	< 0.050
Application	Acrolein	_		NE	NE	NE	<0.050	<0.050	<1.0	<0.050	<0.050
Secretary	Acrylonitrile	_	NE	NE	NE	NE					
Semble Processor   Total   NE	•	_									
Semendering		_									
Somewhare		_									
Biornomeshane											
Fig.   Subjects were   mg   NE											
see Bullykentenere   mgl   NF   NF   NF   NF   1,0°   0.00004   0.00005   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.000000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.000000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.000000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.000000   0.000000   0.000000   0.000000   0.000000   0.000000   0.000000   0.											
one Burglemennen         mgl         AC         NE         NE         NE         1.50 ft         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.00000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000         <0.0000	,										
Genome invaled   mg    MF											
Observations	,										
Observations   Obse											
Observation											
2-Chicorellay-wind reflex											
Discrimentation											
Chloromolame											
Schioroblane											
4-Chicrotalunea   mgr    NE   NE   NE   0.002   4.0010   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020   4.0020											
12-Distromory-3-Chloropropene   mg/l   NE											
13-Dibriormethane											
Discrimentation		_									
12-Delinforobenzene		_									
1-3-Dichloropenzene		_									
14-Dichlorodebusene	,	_									
Dehlorodifuoromethane   mg1   NE   NE   NE   NE   2.1   -0.0050   -0.0050   -0.000   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050   -0.0050	,	_									
1.1 Dichloropethane	,	mg/l									
1.2-Dichloroethane		mg/l									
1.1 Dichloroptehene		mg/l			NE	0.25	<0.0010	<0.0010	<0.020	<0.0010	<0.0010
Cest_12_Dichloroethene		mg/l						<0.0010			<0.0010
trans-12-Dictiloroethene         mg/l         NE         NE         NE         0.01         <0.0010         <0.020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0010         <0.0020         <0.0010         <0.0020         <0.0010         <0.0020         <0.0010         <0.0020         <0.0010         <0.0020         <0.0010         <0.0020         <0.0010         <0.0020         <0.0010         <0.0020         <0.0010         <0.0020         <0.0010         <0.0020         <0.0010         <0.0020         <0.0010         <0.0020         <0.0010         <0.0020         <0.	,	mg/l	NE	NE	NE	0.007	<0.0010	<0.0010	<0.020	<0.0010	<0.0010
12-Dichloropropane	,	mg/l	NE	NE	NE	0.07	<0.0010	<0.0010	<0.020	<0.0010	<0.0010
1-1-Dichloropropene   mg/l   NE	, and the second	mg/l	NE	NE	NE	0.1	<0.0010	<0.0010	<0.020	<0.0010	<0.0010
13-Dichloropropane	1,2-Dichloropropane	mg/l	NE	NE	NE	0.005	<0.0010	<0.0010	<0.020	<0.0010	<0.0010
Cest-13-Dichloropropene   mg/l   NE	1,1-Dichloropropene	mg/l	NE	NE	NE	NE	<0.0010	<0.0010	< 0.020	<0.0010	<0.0010
Rans-13-Dichloropropene   mg/l   NE   NE   NE   NE   NE   -0.0010   -0.0010   -0.0020   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.0010   -0.001	1,3-Dichloropropane	mg/l	NE	NE	NE	NE	<0.0010	<0.0010	<0.020	<0.0010	<0.0010
2.2-Dichloropropane mg/l NE NE NE NE NE NE C.00010	cis-1,3-Dichloropropene	mg/l	NE	NE	NE	0.016	<0.0010	< 0.0010	< 0.020	< 0.0010	<0.0010
Di-isopropyl either	trans-1,3-Dichloropropene	mg/l	NE	NE	NE	NE	<0.0010	<0.0010	<0.020	<0.0010	<0.0010
Ethylbenzene         mg/l         0.7         381         6,180         0.7         0.22         0.041         0.58         <0.0010         <0.0010           Hexachioro-1,3-butadiene         mg/l         NE         NE         NE         NE         40.0010         <0.0010	2,2-Dichloropropane	mg/l	NE	NE	NE	NE	< 0.0010	<0.0010	< 0.020	<0.0010	< 0.0010
Hexachloro-1,3-butadiene   mg/l   NE   NE   NE   NE   NE   0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.001	Di-isopropyl ether	mg/l	NE	NE	NE	NE	<0.0010	<0.0010	<0.020	<0.0010	<0.0010
n-Hexane mg/l NE NE NE NE 0.91 <0.010 <0.010 <0.020 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0	Ethylbenzene	mg/l	0.7	381	6,180	0.7	0.22	0.041	0.58	<0.0010	<0.0010
Sopropylbenzene   mg/l   NE   NE   NE   NE   NE   3,20 °   0.0035   0.0035   0.0030   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.0010   0.001	Hexachloro-1,3-butadiene		NE	NE	NE	NE	<0.0010	<0.0010	<0.020	<0.0010	<0.0010
P-Isopropyltoluene	n-Hexane	mg/l	NE	NE	NE	0.91	<0.010	<0.010	<0.20	<0.010	<0.010
p-Isopropyltoluene mg/l NE NE NE NE NE 9.20 6 0.0035 < 0.0010 < 0.020 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0010 < 0.0	Isopropylbenzene	mg/l	NE	NE	NE	1.4	0.015	0.0095	0.058	< 0.0010	< 0.0010
2-Butanone (MEK) mg/l NE NE NE NE 0.010 0.012 <0.20 <0.010 <0.010 <0.010 Methylene Chloride mg/l NE NE NE NE 0.005 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.	p-Isopropyltoluene		NE	NE	NE	3.20 <sup>6</sup>	0.0035	<0.0010	<0.020	<0.0010	<0.0010
Methylene Chloride         mg/l         NE         NE         NE         0.005         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0050         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010         <0.0010											
4-Methyl-2-pentanone (MIBK)         mg/l         NE         NE         NE         1.2         <0.010         <0.20         <0.010         <0.010           Methyl tert-butyl ether         mg/l         0.04         12,400         200,000         0.04         0.0012         <0.0010	\ /										
Methyl tert-butyl ether         mg/l         0.04         12,400         200,000         0.04         0.0012         <0.0010         <0.020         <0.0010         <0.0010           Naphthalene         mg/l         0.14         22.2         359         0.067         0.045         0.014         0.52         <0.0050	•										
Naphthalene         mg/l         0.14         22.2         359         0.067         0.045         0.014         0.52         <0.0050         <0.0050           n-Propylbenzene         mg/l         NE         NE         NE         1.40 °         0.035         0.019         0.2         <0.0010											
n-Propylbenzene         mg/l         NE         NE         NE         1.40 °         0.035         0.019         0.2         <0.010         <0.0010           Styrene         mg/l         NE         NE         NE         0.1         <0.0010											
Styrene   mg/l   NE   NE   NE   NE   0.1   <0.0010   <0.0010   <0.020   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0.0010   <0	•										
1,1,1,2-Tetrachloroethane         mg/l         NE         NE         NE         0.056         <0.0010         <0.020         <0.0010         <0.0010           1,1,2-Tetrachloroethane         mg/l         NE         NE         NE         0.007         <0.0010		_									
1,1,2,2-Tetrachloroethane         mg/l         NE         NE         NE         0.007         <0.0010         <0.0010         <0.020         <0.0010         <0.0010           Tetrachloroethene         mg/l         NE         NE         NE         0.005         <0.0010		_									
Tetrachloroethene         mg/l         NE         NE         NE         0.005         <0.0010         <0.0010         <0.020         <0.0010         <0.0010           Toluene         mg/l         1         155         2,510         1         <0.0050		_									
Toluene mg/l 1 155 2,510 1 <0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.0050 0.	, , ,	_									
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1,2,4-Trimethylbenzene mg/l NE NE NE 0.14 0.26 0.033 1.2 <0.0010 <0.0010											
11,3,5-1 rimethylbenzene mg/l NE NE NE 0.14 0.044 0.0025 0.24 <0.0010 <0.0010	•										
	•	mg/l									<0.0010
	•	mg/l		NE			<0.0010	<0.0010		<0.0010	<0.0010
Xylenes, Total mg/l 10 41.3 670 10 <b>0.14 0.0074 0.52</b> <0.0030 <0.0030	Xylenes, Total	mg/l	10	41.3	670	10	0.14	0.0074	0.52	<0.0030	< 0.0030

Bold and shaded numbers indicate a concentration above a comparison standard.

<sup>1.</sup> mg/l = Milligrams per liter - parts per million (ppm)

<sup>2.</sup> Ohio Bureau of Underground Storage Tank Regulations (BUSTR), OAC 31301:7-9-13(J)(3)(a) - Action Levels in Ground Water for the Ground Water Ingestion Pathway.

<sup>3.</sup> Ohio Bureau of Underground Storage Tank Regulations (BUSTR), OAC 31301:7-9-13(J)(3)(b) - Action Levels in Ground Water for the Ground to Indoor Air Pathway, Soil Class 1.

<sup>4.</sup> Ohio EPA Voluntary Action Program (VAP) Generic Unrestricted Potable Use Standard (UPUS), OAC 3745-300-08 (D)(3)(b) and (c).

<sup>5.</sup> NE: Not Established (No Regulatory Limits Under the VAP and/or BUSTR Have Been Established for the Specific Compound).

<sup>6.</sup> Standards from the Ohio EPA Voluntary Action Program Chemical Information Database and Applicable Regulatory Standards (CIDARS).

Table 5
Summary of PAHs in Groundwater
Former Fast Food Restaurant
Cleveland, Ohio

Sample ID			BUSTR Standard	s	VAP	BR-GW-MW-1	BR-GW-MW-2	BR-GW-MW-3	BR-GW-MW-4	BR-GW-MW-5
Collection Date		Groundwater	Groundwater to	Groundwater to	Standard	1/24/2012	1/24/2012	1/24/2012	1/24/2012	1/24/2012
Parameter	Units <sup>1</sup>	Ingestion <sup>2</sup>	Indoor Air Residential <sup>3</sup>	Indoor Air Non- Residential <sup>3</sup>	UPUS⁴	Value	Value	Value	Value	Value
Anthracene	mg/l	NE <sup>5</sup>	NE	NE	4.7	<0.000050	0.00013	-	0.000083	<0.000050
Acenaphthene	mg/l	NE	NE	NE	0.95	<0.000050	0.0007	-	<0.000050	<0.000050
Acenaphthylene	mg/l	NE	NE	NE	0.95 <sup>6</sup>	<0.000050	<0.000050	-	<0.000050	<0.000050
Benzo(a)anthracene	mg/l	0.00026	667	4,170	0.00063	<0.000050	<0.000050	-	0.00006	<0.000050
Benzo(a)pyrene	mg/l	0.0002	127	794	0.0002	<0.000050	<0.000050	-	<0.000050	<0.000050
Benzo(b)fluoranthene	mg/l	0.00017	67.2	421	0.00046	<0.000050	<0.000050	-	0.000062	<0.000050
Benzo(g,h,i)perylene	mg/l	NE	NE	NE	0.47 <sup>6</sup>	<0.000050	<0.000050	-	<0.000050	<0.000050
Benzo(k)fluoranthene	mg/l	0.0017	23,800	149,000	0.022	<0.000050	<0.000050	-	<0.000050	<0.000050
Chrysene	mg/l	0.047	7,150	44,700	0.063	<0.000050	<0.000050	-	0.000069	<0.000050
Dibenz(a,h)anthracene	mg/l	0.0002	353	2,210	0.000001 6	<0.000050	<0.000050	-	<0.000050	<0.000050
Fluoranthene	mg/l	NE	NE	NE	0.42	<0.000050	0.00017	-	0.00013	<0.000050
Fluorene	mg/l	NE	NE	NE	0.63	<0.000050	0.00039	-	<0.000050	<0.000050
Indeno(1,2,3-cd)pyrene	mg/l	0.00022	2,020	12,600	0.00034	<0.000050	<0.000050	-	<0.000050	<0.000050
Naphthalene	mg/l	0.14	22.2	359	0.067	0.026	0.0096	-	<0.00025	<0.00025
Phenanthrene	mg/l	NE	NE	NE	4.7 <sup>6</sup>	0.000067	0.00066	-	0.000063	<0.000050
Pyrene	mg/l	NE	NE	NE	0.47	<0.000050	0.00014	-	0.00012	<0.000050
1-Methylnaphthalene	mg/l	NE	NE	NE	1.1	0.0036	0.0051	-	<0.00025	<0.00025
2-Methylnaphthalene	mg/l	NE	NE	NE	0.063 <sup>6</sup>	0.0058	0.0063	-	<0.00025	<0.00025
2-Chloronaphthalene	mg/l	NE	NE	NE	NE	<0.00025	<0.00025	-	<0.00025	<0.00025

## Notes

- 1. mg/l = Milligrams per liter parts per million (ppm)
- 2. Ohio Bureau of Underground Storage Tank Regulations (BUSTR), OAC 31301:7-9-13(J)(3)(a) Action Levels in Ground Water for the Ground Water Ingestion Pathway.
- 3. Ohio Bureau of Underground Storage Tank Regulations (BUSTR), OAC 31301:7-9-13(J)(3)(b) Action Levels in Ground Water for the Ground to Indoor Air Pathway, Soil Class 1.
- 4. Ohio EPA Voluntary Action Program (VAP) Generic Unrestricted Potable Use Standard (UPUS), OAC 3745-300-08 (D)(3)(b) and (c).
- 5. NE: Not Established (No Regulatory Limits Under the VAP and/or BUSTR Have Been Established for the Specific Compound).
- 6. Standards from the Ohio EPA Voluntary Action Program Chemical Information Database and Applicable Regulatory Standards (CIDARS).
- = not tested due to insufficient sample volume

**Bold** numbers indicate a concentration above laboratory detection limits.

Bold and shaded numbers indicate a concentration above a comparison standard.

Table 6 Summary of Sub-Slab Soil Vapor/Soil Gas Results Former Fast Food Restaurant Cleveland, Ohio

Collection Date	Cleveland, Ohio									
Parameter   Units   Screening Level   Includes   Incl	Sample ID					S\	/-1	SV-2	SGP-2	SGP-3
Parameter   Unital	Collection Date				1/23/2012	1/23/2012	2/14/2012	2/14/2012	2/14/2012	2/14/2012
Whytehrotride	Parameter	Units <sup>1</sup>	Screening Lever		Value	Value	Value	Value	Value	Value
Serverne	Acetone	μg/m3	3,500	1,367,090	<2.97	38	3.8	3.6	<2.97	8.1
Serzene	Allyl chloride	ua/m3	10 4 <sup>3</sup>	44.2	< 0.626	<0.626	< 0.626	< 0.626	<0.626	<0.626
Bearry Chorlorde   pgm3   5   25.3   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04   <1.04	Benzene			560	< 0.639	2.3				
Stromonem	Benzyl Chloride		5	25.3	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04
Stromomethane   µgm3   gg   3   220   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776   -0.776	Bromodichloromethane	μg/m3	14	33.5	<1.34	<1.34	<1.34	<1.34	<1.34	<1.34
Carbon disultide         ug/m3         7,000         30,970         -0,622         -0,622         -0,622         -0,622         -0,622         -0,622         -0,622         -0,622         -0,622         -0,622         -0,126         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26         -1,26 <th< td=""><td>Bromoform</td><td>μg/m3</td><td>220</td><td>1,126.2</td><td>&lt;6.21</td><td>&lt;6.21</td><td>&lt;6.21</td><td>&lt;6.21</td><td>&lt;6.21</td><td>&lt;6.21</td></th<>	Bromoform	μg/m3	220	1,126.2	<6.21	<6.21	<6.21	<6.21	<6.21	<6.21
Carbon tetrachieride	Bromomethane	μg/m3	50 <sup>3</sup>	220	<0.776	<0.776	<0.776	<0.776	<0.776	<0.776
Chloroberane	Carbon disulfide	μg/m3	7,000	30,970	<0.622	<0.622	<0.622	<0.622	2.3	6.2
Demonstrane   μgm3   100,000   1,550   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528   <0.528	Carbon tetrachloride	μg/m3	16	82.6	<1.26	<1.26	<1.26	<1.26	<1.26	<1.26
Debroform	Chlorobenzene	μg/m3	600	2,210	< 0.924	< 0.924	< 0.924	< 0.924	< 0.924	< 0.924
2-binormalane   μgm3   μgm3   3.880   0.76   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.413   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415   0.415	Chloroethane	μg/m3	100,000	1,550	<0.528	<0.528	<0.528	<0.528	<0.528	<0.528
2.Chlorotolune	Chloroform	μg/m3	11	53.9	< 0.973	< 0.973	< 0.973	< 0.973	< 0.973	< 0.973
20bmonochromethane   μg/m3   9   45.9   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.70   <1.	Chloromethane	μg/m3	940 <sup>3</sup>	3,980	0.76	< 0.413	< 0.413	< 0.413	<0.413	<0.413
12-Dipromethane	2-Chlorotoluene	μg/m3			<1.03	<1.03	<1.03		<1.03	<1.03
	Dibromochloromethane	μg/m3	9 3	45.9	<1.70	<1.70	<1.70	<1.70	<1.70	<1.70
1,2-Dichloropenzene	1,2-Dibromoethane	μg/m3	1.1	2.1	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54
I.4-Dichloropenzene   μg/m3   8,000   110   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120   <120	1,2-Dichlorobenzene		2,000	8,850	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
	1,3-Dichlorobenzene	μg/m3	1,100	NS	<1.20	<1.20	1.3	<1.20	<1.20	<1.20
1,1-Dichloroethane	1,4-Dichlorobenzene	μg/m3	8,000	110	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
I.1-Dichloroethene   µg/m3   2.000   8.850   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793   -0.793	1,2-Dichloroethane	μg/m3	9.4	47.6	<0.810	<0.810	<0.810	< 0.810	<0.810	<0.810
25-1_2-Dichloroethene   19/m3   350   1.550   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.793   <0.792   <0.9924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924   <0.924	1,1-Dichloroethane	μg/m3	5,000	22,120	<0.802	<0.802	<0.802	<0.802	<0.802	<0.802
Age	1,1-Dichloroethene	μg/m3	2,000	8,850	<0.793	< 0.793	< 0.793	< 0.793	<0.793	< 0.793
1,2-Dichloropropane	cis-1,2-Dichloroethene	μg/m3	350	1,550	< 0.793	< 0.793	< 0.793	< 0.793	< 0.793	< 0.793
1.2-Dichloropropane   µg/m3	trans-1,2-Dichloroethene	μg/m3	700	2,650	< 0.793	< 0.793	< 0.793	< 0.793	<0.793	< 0.793
rans-1,3-Dichloropropene μg/m3 NS na <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908 <0.908	1,2-Dichloropropane		40	120	< 0.924	< 0.924	< 0.924	< 0.924	<0.924	<0.924
A-Dioxane	cis-1,3-Dichloropropene	μg/m3	NS	na	<0.908	<0.908	<0.908	<0.908	<0.908	<0.908
Ethanol Igg/m3 NS na 5.5 98 1,100 550 140 150 Ethylbenzene Igg/m3 220 44,240 <0.867 2.3 <0.867 0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.95 <0.867 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0.983 0	trans-1,3-Dichloropropene	μg/m3	NS	na	<0.908	<0.908	<0.908	< 0.908	<0.908	<0.908
Ethylbenzene	1,4-Dioxane	μg/m3	30 <sup>3</sup>	160	<0.721	<0.721	<0.721	<0.721	<0.721	< 0.721
Frichlorofluoromethane	Ethanol	μg/m3	NS	na	5.5	98	1,100	550	140	150
Dichlorodifluoromethane   μg/m3   2,000   8,850   1.6   39,000   16,000   6,400   29   74    -lexachloro-1,3-butadiene   μg/m3   11   56.3   -6.73   -6.73   -6.73   -6.73   -6.73    -lexachloro-1,3-butadiene   μg/m3   2,000   30,970   -0.705   4.9   2.5   1.7   12   30    -sopropylbenzene   μg/m3   4,000   17,700   -0.983   -0.983   -0.983   -0.983   -0.983   -0.983    -sopropylbenzene   μg/m3   4,000   17,700   -0.983   -0.983   -0.983   -0.983   -0.983   -0.983    -sopropylbenzene   μg/m3   520   2,640   -0.694   0.87   0.76   -0.694   -0.694   1.4    -subthyl Butyl Ketone   μg/m3   10,000   221,210   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69   -3.69	Ethylbenzene	μg/m3	220	44,240	< 0.867	2.3	< 0.867	< 0.867	0.95	< 0.867
Hexachloro-1,3-butadiene         μg/m3         11         56.3         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.74         <6.74         <6.74         <6.74         <6.74         <6.74         <6.74         <6.74         <6.74         <6.72         <6.12         <6.12         <6.12         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.73         <6.79         <6.72         <6.72<	Trichlorofluoromethane	μg/m3	7,000	30,970	<1.12	17	3.9	<1.12	<1.12	5
1-Hexane μg/m3	Dichlorodifluoromethane	μg/m3	2,000	8,850	1.6	39,000	16,000	6,400	29	74
sopropylenzene µg/m3 4,000 17,700 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0.983 <0	Hexachloro-1,3-butadiene	μg/m3	11	56.3	<6.73	<6.73	<6.73	<6.73	<6.73	<6.73
Methylene Chloride         μg/m3         520         2,640         <0.694         0.87         0.76         <0.694         <0.694         1.4           Methyl Butyl Ketone         μg/m3         NS         132,730         <5.11	n-Hexane	μg/m3	2,000	30,970	< 0.705	4.9	2.5	1.7	12	30
Methyl Butyl Ketone         μg/m3         NS         132,730         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.11         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12         <5.12 <td>Isopropylbenzene</td> <td>μg/m3</td> <td>4,000</td> <td>17,700</td> <td>&lt; 0.983</td> <td>&lt; 0.983</td> <td>&lt; 0.983</td> <td>&lt; 0.983</td> <td>&lt;0.983</td> <td>&lt; 0.983</td>	Isopropylbenzene	μg/m3	4,000	17,700	< 0.983	< 0.983	< 0.983	< 0.983	<0.983	< 0.983
2-Butanone (MEK) μg/m3 10,000 221,210 <3.69 <3.69 <3.69 <3.69 <3.69 <3.69 <3.69 <4.69 <4.69 <4.69 <4.69 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.	Methylene Chloride	μg/m3	520	2,640	< 0.694	0.87	0.76	< 0.694	< 0.694	1.4
4-Methyl-2-pentanone (MIBK) μg/m3 800 132,730 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.14 <5.12 <5.12 <5.14 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.12 <5.14 <5.12 <5.12 <5.14 <5.12 <5.12 <5.14 <5.12 <5.12 <5.14	Methyl Butyl Ketone	μg/m3	NS		<5.11	<5.11	<5.11	<5.11	<5.11	<5.11
Methyl methacrylate         μg/m3         7,000         30,970         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.819         <0.811         <0.821         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721         <0.721		μg/m3								
MTBE μg/m3 30,000 4,760 <0.721 1.8 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.721 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <0.851 <	4-Methyl-2-pentanone (MIBK)									
2-Propanol         μg/m3         NS         na         <3.07         13         180         37         <3.07         54           Styrene         μg/m3         10,000         44,240         <0.851	Methyl methacrylate	. 0	,							
Styrene         μg/m3         10,000         44,240         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851         <0.851	MTBE		,							
1,1,2,2-Tetrachloroethane	2-Propanol									_
Tetrachloroethylene         μg/m3         81         210         <1.36         2.8         <1.36         <1.36         2.3         <1.36           Toluene         μg/m3         4,000         17,700         <0.75	Styrene			, .						
Toluene μg/m3 4,000 17,700 <0.75 37 8.3 3.8 11 7.5 1,2,4-Trichlorobenzene μg/m3 2,000 88.5 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <4.66 <1,1,1-Trichloroethane μg/m3 22,000 97,330 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.09 <1.	1,1,2,2-Tetrachloroethane	μg/m3			<1.37		<1.37			
1,2,4-Trichlorobenzene   μg/m3   2,000   88.5   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   <4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.66   4.	Tetrachloroethylene									
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Toluene									
1,1,2-Trichloroethane   μg/m3   15   77.4   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.09   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07	1,2,4-Trichlorobenzene									
Frichloroethylene   μg/m3   2.2   620   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.07   <1.										
Vinyl acetate μg/m3 2,000 8,850 <0.704 <0.704 1.3 <0.704 <0.704 1 Vinyl chloride μg/m3 28 140 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.51	1,1,2-Trichloroethane									
Vinyl chloride μg/m3 28 140 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <0.511 <	Trichloroethylene									
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Vinyl acetate	μg/m3								
3-Xylene μg/m3	Vinyl chloride	μg/m3	28	140						
5-Xylene μg/m3 <	m&p-Xylene	μg/m3	70 000	4 420						
7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7	o-Xylene		,	·						
1,3,5-Trimethylbenzene μg/m3 60 270 <0.982 <0.982 <0.982 <0.982 <0.982 <0.982		μg/m3								
	1,3,5-Trimethylbenzene	μg/m3	60	270	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982

## Notes:

- 1.  $\mu$ g/m3 = Micrograms per meters cubed
- 2. OSWER Screening level reflects an attentuation factor 0.1 and was evaluated for risk of 1 x 10-5 and hazard of 1.
- No OSWER Screening Level. Screening level calculated in accordance with US EPA RAGS 2009.
- USEPA RAGS Volume I: Human Health Evaluation Manual (Part F: Supplemental Guidance for Inhalation Risk Assessment) (2009) - Commercial Exposure (Risk of 10<sup>5</sup> / 1.0)

NS = No Standard

BOLD-Indicates compound detected above laboratory detection limits.

**BOLD** & Shaded-Indicates compound detected above comparison standards.

# APPENDIX A SAMPLING AND ANALYSIS PLAN



## **SAMPLING AND ANALYSIS PLAN**

## Former Burger King Restaurant 9615 Buckeye Road Cleveland, Ohio

## November 30, 2011

CLIENT:

Cuyahoga County Land Reutilization Corporation

Attention: Ms. Cheryl Stephens

323 West Lakeside Avenue, Suite 160

Cleveland, Ohio 44113

PREPARED BY:

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This report has been prepared by Partners Environmental Consulting, Inc. (Partners) for the benefit of our Client in accordance with the approved scope of work. Partners assumes no liability for the unauthorized use of information, conclusions or recommendations included in this report by a third party.

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#### 1.0 PROJECT OVERVIEW

This Sampling & Analysis Plan (SAP) has been developed in preparation for the planned Limited Phase II Property Assessment at 9615 Buckeye Road in Cleveland, Cuyahoga County, Ohio (Property). The location of the Property is shown on **Figure 1**. The Property Plan is shown on **Figure 2**.

This SAP was prepared by Partners Environmental Consulting, Inc. (Partners) and was requested and authorized by the Cuyahoga County Land Reutilization Corp. (CCLRC; Client/User). The SAP was completed in general accordance with the Cuyahoga County Land Reutilization Corporation U.S. EPA Hazardous Substances and Petroleum Grant Brownfield Assessment Program Quality Assurance Project Plan (QAPP), prepared by Partners and dated June 15, 2011, to ensure that sampling and analysis procedures of the Limited Phase II will be adequate to meet the goals and objectives of the QAPP.

## 1.1 Background/Evaluation of Previous Data

A Phase I Environmental Site Assessment (ESA) was completed by Partners for CCLRC in accordance with the United States Environmental Protection Agency (EPA), Standard and Practices for All Appropriate Inquires (AAI), Final Rule (40 CFR Part 312) and ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E1527-05). This work was documented in the Phase I Environmental Site Assessment, Former Fast Food Restaurant, 9615 Buckeye Road, Cleveland, Ohio 44139 report (Phase I report) dated October 10, 2011.

At the time of Phase I report, the Property was unoccupied and the existing restaurant building on the Property was boarded and inaccessible. The Phase I report identified the following Recognized Environmental Conditions (RECs):

## **Property**

Gasoline Filling Station and Associated USTs: Review of Sanborn maps and city directories indicated that the south-central portion of the Property was historically developed with an auto repair facility and associated filling station (2780 Woodhill Road) from 1925 through 1951, when the filling station was rebuilt. According to records, the filling station was again rebuilt in 1973 and assigned a new street address (2796 Woodhill Road). According to the Cleveland Department of Building and Housing (CDBH) records, up to four (4) underground storage tanks (USTs) were installed in various locations on the Property. By 1973, three (3) gasoline USTs were in use on the Property, until they were removed in 1984. According to the Cleveland Fire Protection Bureau (CFPB) records, these USTs were reported as leaking in 1975 and again in 1985. An investigation conducted by the CFPB between April and August 1985 determined that free product was present in the basement of two (2) dwellings located west of the Property (9527 and 9607 Buckeye Road). The investigation involved installing sump pumps, a recovery system, and four (4) "test holes". It was not reported where the "test holes" were drilled and whether soil samples or groundwater samples were collected. The Property was redeveloped in 1988 for use as a Burger King restaurant. Based on evidence of a release of gasoline from the UST system on the Property, Partners concluded that the Property has been adversely impacted by historic gasoline filling station operations.

## Surrounding Sites

• Fork Lift Repair, Manufacturing Operations and UST: Based on a review of historical records, the north adjoining site (2754 Woodhill Road) was developed with a Service Shop and Material Handling Equipment Storage facility in approximately 1956. This facility is located hydraulically crossgradient in the inferred direction of groundwater flow from the Property. This facility was occupied by R.M. Slife & Assoc., a fork lift repair and new/used tow motor sales facility, from 1956 through the 2000s and various equipment, truck and manufacturing operations since at

least 1961 through 2011. CFPB records document the use of battery acid, paint, thinner, a spray room, and hydraulic and motor oil drums stored in the basement. A 1,000-gallon gasoline UST was installed on-site in 1974 and this tank was replaced with a 2,000-gallon UST in 1982. The tank cavity was located south of the facility, along Wamelink Avenue, approximately 40 feet north of the Property. The 2,000-gallon gasoline UST was removed from the site in 1992, underwent Bureau of Underground Storage Tank Regulations (BUSTR) closure activities and was issued a No Further Action (NFA) letter on December 12, 1995. Based on the proximity to the Property and location hydraulically crossgradient in the inferred direction of groundwater flow, Partners concluded that historic fork lift repair, manufacturing operations and the former UST have the potential to adversely impact the Property.

Historic Filling Station Facilities: Based on a review of historical records, CFPB records and CDBH records, the south adjoining site was developed with a gasoline filling station (2795-2797 Woodhill Road, also known as 9700 Buckeye Road) in 1921. This facility was located approximately 125 feet south of the Property, at the southeast corner of the intersection of Buckeye Road and Woodhill Road, which is hydraulically upgradient in the inferred direction of groundwater flow from the Property. Three (3) 1,000-gallon USTs were installed at this facility in 1921 and were abandoned in place and filled with sand and water in 1966. This facility was converted for use as an "Office" (9700 Buckeye Road) associated with a Used Auto Sales Lot in 1956. The facility was converted for use as a food carryout service in 1967, then for use by Triangle Auto Parts in the 1970s, until it was razed in 2009. During occupancy by Triangle Auto Parts, this facility was permitted for the use of sulfuric acid in batteries, lacquer primer, thinner and reducer, a 150-gallon solvent cleaning tank, and a 100-gallon degreaser tank. A CFPB inspection in 1969 indicated the facility conducted minor repairs of parts brought into the store. Based on the proximity to the Property and location hydraulically upgradient in the inferred direction of groundwater flow, Partners concluded that historic gasoline filling station, auto sales and auto parts repair operations had the potential to adversely impact the Property.

Based on a review of historical records, CFPB records and CDBH records, a site located approximately 400 feet southeast of the Property (9801 Buckeye Road) was developed with a gasoline filling station in 1949. This facility is located hydraulically upgradient in the inferred direction of groundwater flow from the Property. This filling station operated four (4) 3,000-gallon gasoline USTs installed in 1950. CFPB records indicate an application to repair a leaking 3,000-gallon UST was filed in 1968. A 500-gallon used oil UST was removed from this facility in 1976 and the facility was converted to a car wash. The four (4) 3,000-gallon USTs were removed in 1986. Based on the proximity to the Property and location hydraulically upgradient in the inferred direction of groundwater flow, Partners concluded that historical gasoline filling station operations have the potential to adversely impact the Property.

Based on the review of the current and historic use of the Property and surrounding sites, Partners evaluated the chemicals of concern (COCs) in soil, groundwater and soil gas and determined the appropriate analyses for each proposed sample point. **Table 1** summarizes the proposed sample locations and laboratory analyses. Depending on the sample location, the COCs were determined to include one (1) or more of the following: volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), Resource Conservation and Recovery Act (RCRA) metals, and total petroleum hydrocarbons (TPH).

## 2.0 SAMPLING AND ANALYSIS PLAN (SAP)

The goal of the Limited Phase II Investigation is to conduct an assessment sufficient to determine whether areas of the Property have been impacted by the RECs identified in the Phase I report. The Limited Phase II will be conducted in a manner consistent with the QAPP and in general accordance with Ohio Environmental Protection Agency (EPA) Voluntary Action Program (VAP) protocol [Ohio Administrative Code (OAC) 3745-300-07, -08, -09, and -10] to comply with certain requirements of the VAP. This will be achieved by conducting an evaluation of soil, groundwater, and soil gas on the Property

with laboratory analysis from a VAP Certified Laboratory (CL) for the analyses identified in **Table 1**. Field and laboratory methods will be compliant with the QAPP and VAP requirements. The objectives are to ensure that:

- The sampling procedures employed at the Property are consistent with the sample quality requirements of the Certified Laboratory.
- Data from the Certified Laboratory are adequate for use in the VAP.
- Acceptable Quality Assurance/Quality Control (QA/QC) procedures have been established and employed when collecting field data.
- Data collection, field-testing, field screening and sampling techniques are established and used in a manner consistent with achieving the purpose of the work.

This SAP is a document that field personnel can rely on to be sure the environmental samples are collected, stored, shipped, and tested without compromising the integrity of the samples or data. The information presented in this SAP will enable field personnel to collect the samples in a manner that meets the objectives of the QAPP.

Results of soil analyses will be compared to certain of the VAP Generic Numerical Standards presented in OAC 3745-300-08. These include the Generic Direct Contact Soil Standards (GDCS) for Residential Land Use, the GDCS for Commercial and Industrial Land Use, the GDCS for Construction and Excavation Activities, and/or TPH Soil Saturation Concentrations. Results of groundwater analyses will be compared to Ohio EPA VAP Generic Unrestricted Potable Use Standards (UPUS) detailed in OAC 3745-300-08. Constituents for which no GDCS or UPUS standards have been derived will be compared to the Ohio EPA VAP Chemical Information Database and Applicable Regulatory Standards (CIDARS), Supplemental Criteria.

## 2.1 Scope of Work

The scope of work includes the collection and analysis of soil, groundwater, and sub-slab soil vapor samples. The following scope of work for the Limited Phase II Investigation activities is based on the prior site assessment activities conducted by Partners.

## Ground Penetrating Radar and Electromagnetic Survey

Based on Partners' Phase I findings, multiple USTs associated with the gasoline/filling stations may remain on the Property. Therefore, Partners will attempt to determine if USTs or associated systems are present on the Property by conducting a non-intrusive investigation using ground penetrating radar (GPR) and an electromagnetic (EM) survey. The GPR and EM surveys will be limited to areas located outside of existing building footprint.

The GPR survey will be completed using ground penetrating radar with a 500 MHz transducer/receiver antenna on a grid with approximately five (5)-foot line spacing. The area(s) to be surveyed will be selected by Partners and will not exceed approximately 42,000 square feet of total survey area or the amount that can be completed in an eight (8) hour working day.

The data generated by the GPR will be interpreted in the field by qualified personnel. Any image that is deemed to have a reasonable potential of representing the location of a UST and/or product piping will be marked on the ground surface using spray paint.

The GPR signal depth of penetration is dependent upon many factors. Some of the items that can adversely affect the signal penetration depth include, but are not limited to, steel reinforced concrete, water on the ground surface, overly wet soil conditions, high metal content fill material (such as slag),

salty soil, and voids in the subsurface. Surface obstacles such as automobiles, fences, and overgrown vegetation will represent data gaps and will therefore be limitations to the survey.

The EM survey will be completed over the same area as the GPR survey. The EM survey will be completed using a Schonstedt Magnetic and Cable Locator instrument on an approximately 10-foot line spacing. The audible signal from the magnetic locator will be interpreted in the field by qualified personnel. Magnetic anomalies thought to represent potential UST and/or product piping locations will be marked on the ground surface using spray paint.

Boring locations may be adjusted or the scope of work may be revised based on the findings of the GPR/EM surveys. An amendment to this SAP will be prepared for any revisions to the scope of work.

## Geoprobe™ Borings

Partners will complete nine (9) soil borings across the Property using direct push technology (Geoprobe™). The soil borings will be positioned to assess the areas of concern previously identified and will also be based upon the findings of the GPR/EM survey. The proposed sampling locations for the Property are shown on **Figure 2** and are summarized as follows:

- Seven (7) soil borings will be installed in various locations throughout the Property to address the former USTs, pump islands and auto repair facilities on the Property.
- One (1) soil boring will be installed along the northern Property boundary to address the adjacent fork lift and manufacturing operation at 2754 Woodhill Road.
- One (1) soil boring will be installed in the southeast portion of the Property to address the former gasoline stations and auto repair facilities located southeast of the Property.

Direct push methods will be used to advance the nine (9) soil borings to 20-feet below the ground surface, sampler refusal, or groundwater, whichever is encountered first. While the maximum depth of the soil borings is not anticipated to be greater than 20 feet, if an investigation is warranted at greater depths, the number of borings may be scaled back, or additional time/costs may be incurred only after receiving the Client's written approval.

All soil borings will be abandoned by backfilling the borings with bentonite. The soil borings will be completed at the surface with like materials (i.e., concrete, etc.). All field screened soil and/or excess soil cuttings generated during soil sampling activities will be placed into DOT-approved 55-gallon steel drums that are labeled and temporarily staged in an area approved by the Client.

## Soil Sampling and Analysis

Soil samples will be collected from the ground surface continuously to the terminal depth of each boring [Standard Operating Procedure (SOP) No. 012]. The soil samples recovered by the direct push methods will be visually classified according to the Unified Soil Classification System (USCS) by a qualified member of Partners' field staff (SOP No. 004), and placed into pre-cleaned, laboratory-supplied jars. Boring logs will be completed noting the soil classification and any other relevant observations. Each sample will be labeled, logged on a chain of custody and placed in a cooler with ice for potential transport to the laboratory. In addition, a representative portion of the sample will be placed in a sealable plastic bag for organic vapor screening using a photoionization detector (PID) (SOP No. 007). After an equilibration period, these samples will be screened for organic vapors using a PID. The laboratory portion of each sample will be placed in a pre-cleaned glass sample jar, capped with a Teflon® lined lid, labeled and stored in a cooler with ice for preservation until delivery to the laboratory. Soil samples collected for VOC analysis will be collected using the Encore<sup>TM</sup> or equivalent sampler (SOP 029). Select soil samples from the soil borings will be submitted to the laboratory based on visual observations, odors, the specific area being assessed, and/or PID readings.

Soil samples will be submitted to the laboratory for one (1) or more of the following analyses:

- VOCs by the EPA Method 8260, (six [6] samples).
- PAHs by EPA Method 8270, (six [6] samples).
- TPH C<sub>6</sub>-C<sub>10</sub> by EPA Method 8015, (six [6] samples).
- TPH C<sub>10</sub>-C<sub>34</sub> by EPA Method 8015, (three [3] samples).
- RCRA 8 Metals Method 6010/7470, (two [2] samples).
- PCBs by EPA Method 8082 (two [2] samples).

In accordance with the QAPP and USEPA requirements, QA/QC samples will be collected during soil sampling activities and submitted for the appropriate analysis. QA/QC samples submitted for analysis will include trip blanks, equipment blanks, and duplicate samples (**SOP No. 006**). Field procedures regarding the collection and analysis of QA/QC samples are summarized in **Table 2**.

The laboratory is expected to provide the soil analytical data to Partners within seven (7) to 10 business days of receipt of the samples (normal turnaround time).

## **Groundwater Monitoring Well Installation**

Partners will convert up to five (5) soil borings to groundwater monitoring wells at the Property at boring locations previously sampled using direct push methods. The monitoring wells will be installed with a drill rig capable of hollow-stem augering (HSA). Additional soil samples will not be collected from these borings. The proposed sampling locations for the Property are shown on **Figure 2**. Groundwater monitoring wells will be installed to depths up to approximately 20 feet bgs. The wells will be constructed with one (1) inch polyvinyl chloride (PVC) screen and solid riser pipe. The screen (10 feet long) will be positioned to span the groundwater interface. The annulus around the monitoring wells will be backfilled with sand to above the top of the screen and will be sealed with a bentonite plug. The wells will be completed with a protective flush-mounted cover set in a concrete pad.

## Groundwater Monitoring Well Development, Purging/Sampling and Analyses

The wells will be developed by bailing and then allowed to recover a minimum of 24 hours prior to purging and sampling (SOP No. 003).

Prior to purging, the static water level in each well will be measured using an oil/water interface probe to determine depth to groundwater and as a check for the presence of a non-aqueous phase liquids (NAPLs) (SOP Nos. 008 & 032). Groundwater purging and sampling will be conducted using low-flow sampling techniques (e.g., bladder pump) and new disposable tubing in conjunction with a controller (SOP 035). The purged groundwater will be constantly monitored using a flow-through cell water quality meter that measures the temperature, pH, specific conductivity, oxidation-reduction potential (ORP), turbidity, and dissolved oxygen. Purge volumes, color, odor, and water quality parameters associated with each well will be noted on a Groundwater Sampling Log. All groundwater removed during this process will be placed into DOT-approved 55-gallon steel drums that are labeled and temporarily staged in an area approved by the Client.

The groundwater samples will be transferred from the bladder pump tubing directly into laboratory supplied sample containers. Each sample will be labeled, logged on a chain of custody and placed in a cooler with ice for transport to the laboratory. If a monitoring well purges dry, a groundwater sample will be collected for analyses after the well recovers for a sufficient volume to permit the groundwater sample to be collected.

Groundwater from the five (5) monitoring wells will be collected and submitted for analysis of the following:

- VOCs by EPA Method 8260, and
- PAHs by EPA Method 8270.

Each sample will be analyzed by the laboratory on normal (seven [7] to 10 days) turnaround.

In accordance with the QAPP and USEPA requirements, QA/QC samples will be collected during groundwater sampling activities and submitted for the appropriate analysis. QA/QC samples submitted for analysis will include trip and equipment blanks and duplicate samples (**SOP No. 006**). Field procedures regarding the collection and analysis of QA/QC samples are summarized in **Table 2**.

## Sub-Slab Soil Gas Sampling

Partners will install one (1) sub-slab soil gas sample point through the floor of the existing building. Partners will use a Summa canister to collect the soil gas sample from this point (**SOP No. 041**). The Summa canister will collect soil gas over a three (3)-hour period.

In addition, one (1) sample will be obtained of ambient air in an exterior area believed to be un-impacted by the concerns being assessed in order to evaluate potential background conditions. Once the sampling time is complete, the Summa canister will be sealed and submitted for analysis. The soil gas samples will be analyzed for VOCs by EPA Method 8260, Compendium Method TO-15.

## 2.2 Sampling Procedures and Sample Quality

To ensure sample quality, sampling procedures consistent with VAP guidelines, the QAPP, and standard practices are utilized by Partners and are presented in the following SOPs included in **Appendix A**. These SOPs will be followed when conducting the referenced activities.

- SOP No. 001: Sampling Procedures for Groundwater Monitoring Wells,
- SOP No. 003: Development of Wells Using Surging Techniques,
- SOP No. 004: Soil Description (Unconsolidated Material),
- SOP No. 005: Sampling Equipment Decontamination,
- SOP No. 006: Quality Assurance/Quality Control Samples,
- SOP No. 007: Headspace Screening for Volatile Organic Compounds,
- SOP No. 008: Fluid Level Measurements in Groundwater Monitoring Wells,
- SOP No. 009: Drilling Equipment Decontamination,
- SOP No. 010: Design and Installation of Single-Cased Monitoring Wells.
- SOP No. 012: Geoprobe Sampling of Soils,
- SOP No. 013: Surveying,
- SOP No. 014: Split Spoon Sampling of Soils,
- SOP No. 019: Chain-of-Custody Procedures,
- SOP No. 024: Management of Investigation Derived Wastes.
- SOP No. 027: Shipping Environmental Samples,
- SOP No. 029: Soil Sampling With Encore® Sampler (or Method 5035 equivalent).

- SOP No. 031: Calibration of Thermo Environmental 580-B Photoionization Detector.
- SOP No. 032: Water Meter Operations,
- SOP No. 035: Low Flow Sampling Procedures for Groundwater Monitoring Wells, and
- SOP No. 041: Soil Vapor Sampling Procedures.

## 2.3 Adequacy of Laboratory Data

Data from the CL must be adequate for use in comparison with the VAP. To ensure the adequacy of the data, the following will be completed:

- Partners will use a VAP CL [Environmental Science Corp. (ESC), VAP Certification #CL0069] and verify that the laboratory is capable and certified for performing the analyses outlined in **Section 2.1** of this document.
- Partners will notify the CL that samples are to be analyzed in accordance with the VAP.
- Partners will communicate with the CL the applicable standards required for the Property and ensure that the CL is capable of detecting the COCs at or below the applicable standards.

In accordance with OAC 3745-300-04 (H)(8), the CL must disclose when it is not capable of detecting the COCs at or below the applicable standards for the Property. This disclosure may be in the analytical report or by other means. **Table 3** presents the ESC Analytical Parameters, Laboratory Reporting Limits, Method Detection Limits, and Ohio VAP and U.S. EPA Regions III, VI, and IX RSL Single Chemical Standards.

## 2.4 Quality Assurance/Quality Control

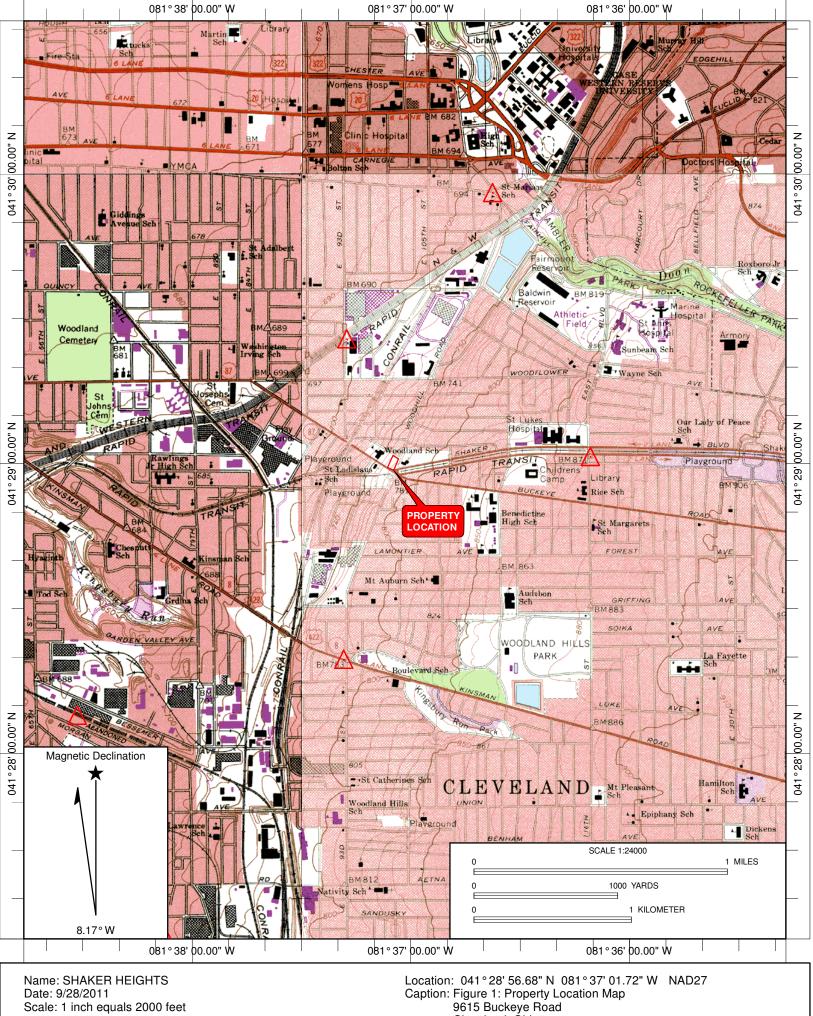
Acceptable QA/QC procedures have been established and will be employed when collecting field data. The field quality assurance and quality control procedures serve to: minimize sources of error; minimize the potential for cross contamination; and maximize the representativeness of the data collected.

Field QA/QC procedures regarding the collection and analysis of trip blanks, equipment blanks, duplicates, and laboratory MS/MSD are detailed in the QAPP and shown on **Table 2**. Other field QA/QC procedures include the following:

- Calibration of field instruments, including procedures for instrument correction and re-calibration when necessary, are detailed in SOP 031 (Appendix A) and shown on **Table 4**.
- Sample handling, preservation and holding times are outlined on Table 5.
- Documentation and record maintenance will be conducted by Partners and will consist of documentation of all field activities and maintenance of all laboratory reports and waste disposal documentation. Partners will prepare a report, which will include all of the documentation.
- Samples will be submitted to the Certified Laboratory under chain-of-custody as described in SOPs 019 and 027 (Appendix A).

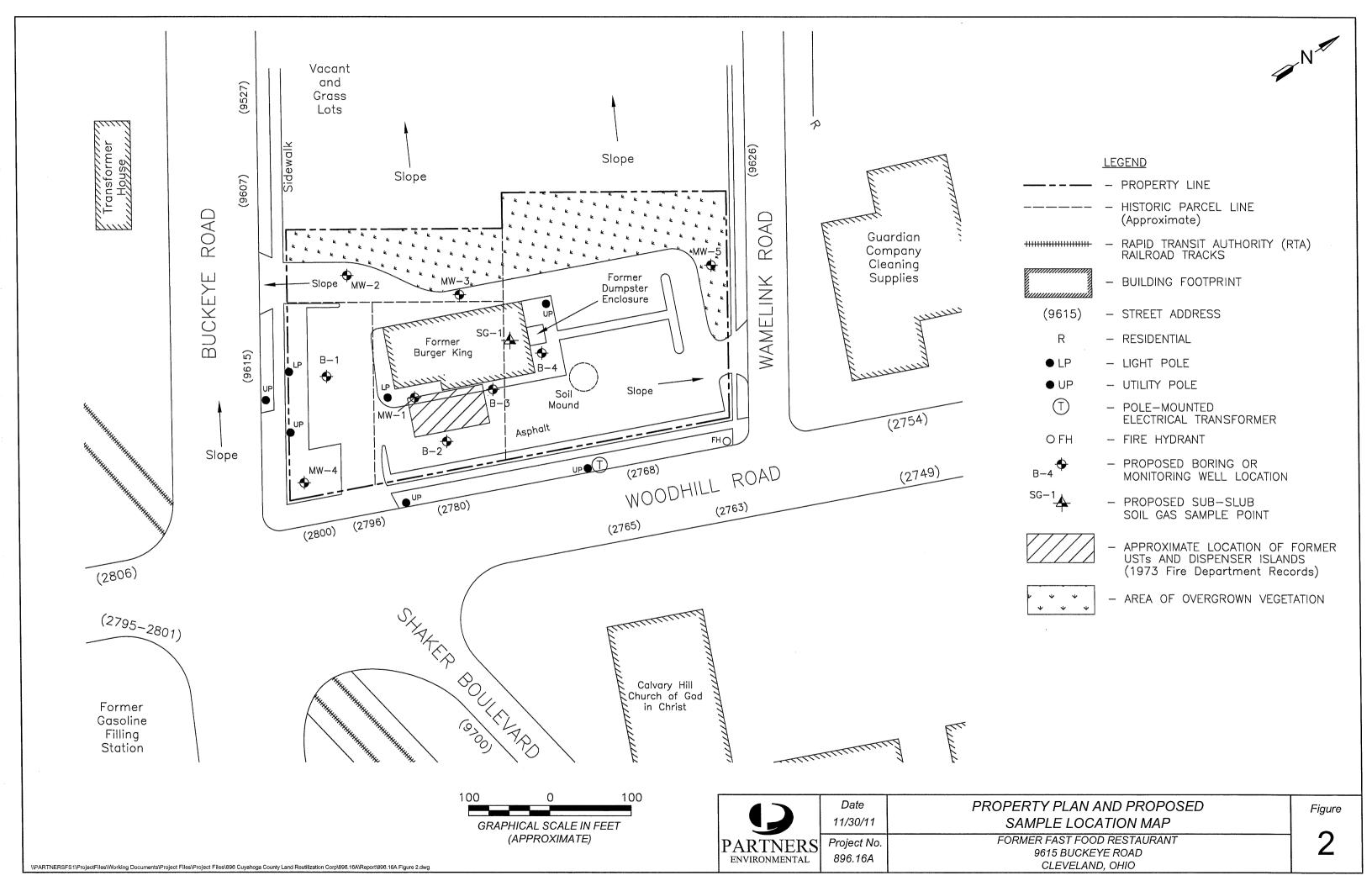
Partners has reviewed the laboratory quality assurance program plan and standard operating procedures. This document is kept at our office and is available for review upon request. Also available is the Cuyahoga County Land Reutilization Corporation U.S. EPA Hazardous Substances and Petroleum Grant Brownfield Assessment Program Quality Assurance Project Plan (QAPP), prepared by Partners and dated June 15, 2011.

# **FIGURES**



Datum: NAD27

Cleveland, Óhio



## **TABLES**

Table 1
Summary of Proposed Boring, Monitor Well, and Soil Gas Locations & Analyses
Former Burger King Restaurant - 9615 Buckeye Road
Cleveland, Ohio

									Labora	atory Analysis per	formed by	ESC Laboratory	/ Services				
Recognized Environmental Condition	Boring/Well/ Sample Number	Installation Date	Sample/Drill Method	Total	Depth	VOC EPA Method	8260B	PAH EPA Method	8270C	RCRA Me EPA Meth 6010B/74	ods	PCB EPA Metho		TPH (C		TPH (C10 EPA Metho	
Condition	Number			DP	HSA	Soil	GW	Soil	GW	Soil	GW	Soil	GW	Soil	GW	Soil	GW
	B-1	TBD	DP	20'	-	-	-	-	-	0-6'	-	0-2'	-	-	-	-	-
	B-2	TBD	DP	20'	-	4-10'	-	4-10'	-	-	-		-	4-10'	- 1	4-10'	-
	B-3	TBD	DP	20'	-	4-10'	-	4-10'	-	-	-	-	-	4-10'	-	4-10'	-
	B-4	TBD	DP	20'	-	8-10'	-	8-10'	-	0-6'	-	0-2'	-	8-10	-	-	-
_																	
On-Property:	MW-1	TBD	DP/HSA	20'	20'	2-10'	1	2-10'	1	-		-	l -	2-10'	- [	4-10'	-
Former Filling	MW-2	TBD	DPHSA	20'	20'	4-10'	1	4-10'	1	-	-	-	-	4-10'		-	-
Station(s) and USTs	MW-3	TBD	DP/HSA	20'	20'	4-10'	1	4-10'	1	-			-	4-10'	-	-	-
	SS-2	TBD	Sub-Slab Soil Vapor	•	-	TO-15 AIR (1)	-	-	-	-	-	-	-	-		-	-
	Background	TBD	Ambient Air	-	-	TO-15 AIR (1)	-		-	=	-	-	-	-	-	-	-
Off-Property: Former Repair & Manufacturing Operations; UST	MW-4	TBD	DP/HSA	20'	20'	-	1	-	1	₹.	-		-	-	-	÷ .	-
Off-Property: Southeast Adjoining Former Filling Stations	MW-5	TBD	DP/HSA	20'	20'	-	1	-	1		-	· •	-	- -	-	- -	-

Notes:

DP = Direct Push HSA = Hollow Stem Auger

- = not applicable, sampling/testing not completed

TBD = To Be Determined

B = Soil Boring

MW = Monitor Well

SS = Sub-Slab Soil Vapor

DP = Direct Push

HSA = Hollow Stem Auger

Table 2 Quality Assurance/Quality Control (QA/QC) Sample Requirements Former Burger King Restaurant - 9615 Buckeye Road Cleveland, Ohio

	QC Sample Type	Frequency of Sample/Analysis	Details
ω	Equipment Blanks	1 per 20 investigative samples (per sample matrix), or 1 per investigative method	Distilled water placed into contact with sampling equipment. Used to assess quality of data from field sampling and decontamination procedures.
Field Samples	Trip Blanks	1 per sample cooler for VOC analysis	Laboratory prepared organic-free blank to assess potential contamination during sample container shipment and storage.
	Duplicate Samples	1 per 20 investigative samples (per sample matrix)	Duplicate sample collected by the same methods and at the same time as original sample. Used to verify sampling and analytical reproducibility.
səld	Matrix Spike/Matrix Spike Duplicate (MS/MSD)	1 MS/MSD per 20 samples or in accordance with laboratory SOP	Laboratory spiked sample to evaluate matrix and measurement methodology
Laboratory Samples	Method Blanks	1 method blank per daily run as needed.	Laboratory blank sample to assess potential for contamination from laboratory instruments or procedures.
Lak	Laboratory Control and Duplicates	Analyzed as per method requirements and laboratory SOPs	Evaluates laboratory reproducibility.

Table 3
Environmental Science Corp. Analytical Parameters, Laboratory Reporting Limits, Method Detection Limits, and Ohio VAP and U.S. EPA Regions III, VI, and IX RSL Single Chemical Standards Former Burger King Restaurant - 9615 Buckeye Road

Cleveland, Ohio						Ohio V	AP							USEPA	
				SOIL		Oillo V				GW			REGION	III, VI, and IX Combine	d RSLs
Chemicals of Concern	Analytical Method	Reporting Limit	Method Detection Limit	Res. Single	C/I Single	Const. Single	Soil Saturation Standard	MCL	Analytical Method	Reporting Limit	Method Detection Limit	VAP UPUS Standard	SOIL INDUSTRIAL	RESIDENTIAL	TAP WATER
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L		ug/L	ug/L	ug/L	mg/kg	mg/kg	ug/L
Volatile Organic Compounds															
Acetone	8260	0.05	0.017000	64,000	100,000	100,000	100,000	NA	8260	50.0000	8.92	14,000	630,000	61,000	22,000
Benzene	8260	0.001	0.000325	64	140	150	920	5	8260	1.0000	0.288	5	5.4	1.1	0.41
Carbon Disulfide	8260	0.001	0.000344	1,400	1,400	190	1,400	NA	8260	1.0000	0.32	1,400	3,700	820	1,000
Carbon Tetrachloride	8260	0.001	0.000320	5.5	8.2	24	1,400	5	8260	1.0000	0.31	5	3.0	0.61	0.44
Chlorobenzene	8260	0.001	0.000250	410	710	740	740	100	8260	1.0000	0,26	100	1,400	290	91
Chloroethane (Ethyl chloride)	8260	0.005	0.000586	10,000	2,200	2,200	2,200	NA	8260	5.0000	0.856	550	61,000	15,000	21,000
Chloroform	8260	0.005	0.000411	7	14	55	3,400	NA	8260	5.0000	0.33	40	1.5	0.29	0.19
Dibromochloromethane	8260	0.001	0.000387	130	1,600	1,600	1,600	NA NA	8260	1.0000	0.37	19	3.3	0.68	0.15
Dichlorodifluoromethane	8260	0.005	0.000320	380	520	1,400	1,400	NA NA	8260	5.0000	0.541	2,100	780	180	390
Dichloroethane, 1,1 -	8260	0.001	0.000259	2,000	2,300	2,300	2,300	NA .	8260	1.0000	0.31	250	17	3,3	2.4
Dichloroethane, 1,2 -	8260	0.001	0.000531	8.7	19	75	2,900	5	8260	1.0000	0.274	5	2.2	0.43	0.15
Dichloroethene, 1,1 -	8260	0.001	0.000742	410	610	180	1,700	7	8260	1.0000	0.495	7	1,100	240	340
Dichloroethene, cis - 1,2	8260	0.001	0.000723	760	2,200	2,200	2,200	70	8260	1.0000	0.38	70	2,000	160	73
Dichloroethene, trans - 1,2 -	8260	0.001	0.000678	180	260	78	1,800	100	8260	1.0000	0.3	100	690	150	110
Dichloropropane, 1,2 -	8260	0.001	0.000751	19	31	30	1,100	5	8260	1.0000	0.52	5	4.5	0.89	0.39
Dichloropropene, 1,3 -	8260	0.001	0.000284	35	84	38	810	NA	8260	1.0000	0.23	16	8.1	1.7	0.43
Dioxane, 1,4 -	8260	0.10	0.033	260	600	2,300	270,000	NA	8260	4.0000	1.32	140	17	4.9	0.67
Ethyl Ether	8260	0.001	0.000335	15,000	33,000	33,000	33,000	NA	8260	1.0000	0.183	3,200	200,000	16,000	7,300
Ethylbenzene	8260	0.001	0.000226	230	230	230	230	700	8260	1.0000	0.222	700	27	5.4	1.5
Formaldehyde	8260	NA	NA	560	1,200	3,500	130,000	NA	8260	NA NA	NA	3,200	120,000	12,000	7,300
Formic acid	8260	NA	NA	1,200	1,700	1,500	170,000	NA	8260	NA	NA	32,000	1,200,000	120,000	73,000
Hexane, n -	8260	0.01	0.003	190	190	190	190	NA	8260	10.0000	0.189	910	2,600	570	880
Isobutyl Alcohol	8260	NA	NA	23,000	40,000	40,000	40,000	NA	8260	NA	NA	4,700	310,000	23,000	11,000
Methanol	8260	NA	NA	33,000	110,000	110,000	110,000	NA	8260	NA	NA	7,900	310,000	31,000	18,000
Methyl Ethyl Ketone (2-Butanone)	8260	0.01	0.002679	37,000	100,000	15,000	100,000	NA	8260	10.0000	4.53	8,900	200,000	28,000	7,100
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	8260	0.01	0.001397	5,800	16,000	12,000	16,000	NA	8260	10.0000	1.42	1,200	53,000	5,300	2,000
Methyl tert - Butyl Ether (MTBE)	8260	0.001	0.000278	850	1,900	6,700	6,700	40	8260	1.0000	0.193	40	220	43	12
Methylene Chloride	8260	0.005	0.000600	250	570	1,500	2,300	5	8260	5.0000	0.295	5	53	11	4.8
Styrene	8260	0.001	0.000203	1,700	1,700	1,700	1,700	100	8260	1.0000	0.38	100	36,000	6,300	1,600
Tetrachloroethane , 1,1,1,2 -	8260	0.001	0.000199	37	81	310	750	NA	8260	1.0000	0.4	56	9.3	1.9	0.52
Tetrachloroethane, 1,1,2,2 -	8260	0.001	0.000329	11	24	94	1,700	NA	8260	1.0000	0.22	7	2.8	0.56	0,067
Tetrachloroethene	8260	0.001	0.000231	17	53	220	380	5	8260	1.0000	0.293	5	2.6	0.55	0.11
Toluene	8260	0.005	0.001214	520	520	520	520	1,000	8260	5.0000	0.269	1,000	45,000	5,000	2,300
Trichloroethane, 1,1,1 -	8260	0.001	0.000516	1,300	1,300	1,300	1,300	200	8260	1.0000	0.27	200	38,000	8,700	9,100
Trichloroethane, 1,1,2 -	8260	0.001	0.000456	25	55	210	2,600	5	8260	1.0000	0.451	5	5.3	1,1	0.24
Trichloroethene	8260	0.001	0.000336	65	150	560	950	5	8260	1.0000	0.37	5	14	2.8	2.0
Trichlorofluoromethane	8260	0.005	0.000273	1,200	1,600	1,600	1,600	NA	8260	5.0000	0.286	3,800	3,400	790	1,300
Trichloropropane, 1,2,3 -	8260	0.001	0.000675	1.5	28	190	1,100	NA	8260	1.0000	0.36	NP	0.095	0.005	0.00077
Vinyl Chloride	8260	0.001	0.000287	4,6	12	48	1,100	2	8260	1.0000	0.273	2	1.7	0.06	0.016
Xylenes, Total	8260	0.003	0.000460	370	370	370	370	10,000	8260	3.0000	0.86	10,000	2,700	630	200
Semi-Volatile Organic Compounds									, ,		-				
Acenaphthene	8270	0.033	0.007330	3,500	56,000	440,000	NA .	NA	8270	1.0000	0.134	950	33,000	3,400	2,200
Acetophenone	8270	0.330	0.00646	6,300	110,000	850,000	NA	NA	8270	10.0000	0.221	1,600	100,000	7,800	3,700
Acrylonitrile	8260	0.010	0.002028	6.6	16	14	22,000	NA	8260	10.0000	1.71	NP	1.2	0.24	0.045
Alachlor	8270	NA	NA	NP	NP	NP	NA	2		NA	NA NA	2	31	8.7	1.2
Aniline	8270	0.330	0.031	220	540	1,300	62,000	NA	8270	10.0000	1.4	110	300	85	12
Anthracene	8270	0.033	0.023000	18,000	280,000	1,000,000	NA	NA	8270	1.0000	0.116	4,700	170,000	17,000	11,000
Atrazine	8270	0.333	0.00998	NP	NP	NP	NA NA	3		10.0000	0.243	3	7,5	2.1	0,29
Benzidine	8270	0.330	0.046500	0.04	0.30	2.5	NA	NA	8270	10.0000	0.94	NP	0.0075	0.0005	0.000094

Table 3
Environmental Science Corp. Analytical Parameters, Laboratory Reporting Limits, Method Detection Limits, and Ohio VAP and U.S. EPA Regions III, VI, and IX RSL Single Chemical Standards Former Burger King Restaurant - 9615 Buckeye Road Cleveland, Ohio

Cleveland, Ohio						Ohio V	ΔΡ								USEPA	
				SOIL		00				GW				REGION II	II, VI, and IX Combine	d RSLs
Chemicals of Concern	Analytical Method	Reporting Limit	Method Detection Limit	Res. Single	C/I Single	Const. Single	Soil Saturation Standard	MCL	Analytical Method	Reporting Limit	Method Detection Limit	VAP UPUS Standard	SOIL INDUS	STRIAL	RESIDENTIAL	TAP WATER
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L		ug/L	ug/L	ug/L	mg/k	,	mg/kg	ug/L
D(a)th	8270	0.033	0.009260	11	76	680	NA	0.2	8270	1.0000	0.209	0.63	2.1		0.15	0.029
Benzo(a)anthracene	8270	0.033	0.008470	1.1	7.7	69	NA NA	NA	8270	1.0000	0.182	0.2	0.21		0.015	0.0029
Benzo(a)pyrene Benzo(b)fluoranthene	8270	0.033	0.009830	11	77	690	NA	NA	8270	1.0000	0.36	0.46	2.1		0.15	0.029
Benzo(k)fluoranthene	8270	0.033	0.008870	110	770	6,900	NA NA	NA .	8270	1.0000	0.318	22	21		1.5	0.29
Bis (2-ethylhexyl) Phthalate (BEHP & DEHP)	8270	0.330	0.072000	190	190	190	190	6	8270	1.0000	0.572	6	120		35	4.8
Butyl Benzyl Phthalate	8270	0.330	0.038290	58	58	58	58	NA	8270	1.0000	0.342	110	910		260	35
Carbazole	8270	0.330	0.0226	430	3,400	30,000	NA NA	NA	8270	10.0000	0.95	79	NA		NA	NA NA
Carbofuran		NA NA	NA NA	NP	NP NP	NP	NA NA	40		NA	NA	40	3,100	)	310	180
Chlordane	8081	0.2	0.00301	28	270	77	NA NA	2	8081	0.5000	0.152	2	6.5		1.6	0.19
Chrysene	8270	0.033	0.013200	1,100	7,600	69,000	NA	NA	8270	1.0000	0.272	63	210		15	2.9
Dalapon	8151	0.800	0.00672	NP	NP	NP	NA NA	200	8151	200.0000	0.09	200	18,00	0	1,800	1,100
Dibenz(a,h)anthracene	8270	0.033	0.006800	1.1	7.7	69	NA NA	NA	8270	1.0000	0.41	NP	0.21		0.015	0.0029
Dibromochloropropane (DBCP)	8260	0.010	0.001157	NP	NP	NP	NA NA	0.2	8260	5.0000	0.48	0.2	0.069		0.0054	0.00032
Dichlorobenzene. 1.2 - (o)	8260	0.001	0.000237	370	370	370	370	600	8260	1.0000	0.29	600	9,800	)	1,900	370
Dichlorobenzene, 1,3 - (m)	8260	0.001	0.000379	68	240	NA	NA	NA	8260	1.0000	0.189	13	NA.		NA	NA
Dichlorobenzene, 1,4 - (p)	8260	0.001	0.000218	60	130	510	NA	75	8260	1.0000	0.3	75	12		2.4	0.43
Dichlorobenzidine, 3.3 -	8270	0.330	0.038100	19	110	730	NA	NA	8270	10.0000	0.79	NP	3.8		1.1	0.15
Dichlorodiphenyldichloroethane (DDD)	8081	0.02	0.002241	42	470	2,800	NA	NA	8081	0.5000	0.0137	3.5	7.2		2	0.28
Dichlorodiphenyldichloroethene (DDE)	8081	0.02	0.002365	29	310	2,200	NA	NA	8081	0.5000	0.127	2.6	5.1		1.4	0.2
Dichlorodiphenyltrichloroethane (DDT)	8081	0.02	0.002674	30	350	700	NA	NA	8081	0.5000	0.0192	2	7		1.7	0.2
Dichlorophenoxyacetic acid, 2,4 - (2,4-D)	8151	0.070	0.01221	630	11,000	8,500	NA	70	8151	2.0000	0.14	70	7,700		690	370
Di(2-ethylhexyl)adipate	0.01	NA NA	NA NA	NP	NP	NP	NA NA	400		NA NA	NA	400	1,400		400	56
Diethyl Phthalate	8270	0.330	0.006770	590	590	590	590	NA	8270	1.0000	0.122	13,000	490,00	0	49,000	29,000
Dimethylphenol, 2,4 -	8270	0.330	0.061500	1,300	22,000	170,000	NA NA	NA	8270	10.0000	2.14	310	12,00	,	1,200	730
Dinoseb	8151	0.070	0,00535	NP	NP	NP	NA	7	8151	2.0000	0.11	7	620		61	37
Di-n-butyl Phthalate	8270	0.330	0.017500	110	110	110	110	NA	8270	1.0000	0.214	1,500	62,00		6,100	3,700
Dinitrobenzene, meta -	8270	NA	NA NA	6.3	110	850	NA	NA	8270	NA	NA	NP	62		6.1	3.7
Dinitrobenzene, ortho -		NA NA	NA	6.3	110	850	NA	NA	-	NA NA	NA	NP	62		6.1	3.7
Dinitrotoluene, 2,4 -	8270	0,330	0.010400	13	98	870	NA	NA	8270	10.0000	1.08	32	5.5		1.6	0,22
Dinitrotoluene, 2.6 -	8270	0,330	0.008750	13	100	880	NA	NA	8270	10.0000	1.44	16	620		61	37
Dioxin (2,3,7,8-TCDD)		NA	NA NA	NP	NP	NP	NA	0.00003		NA	NA	0.00003	0.0000	18	0.0000045	0.00000052
Diquat		NA NA	NA NA	NP	NP	NP	NA	20		NA	NA	20	1,400		130	80
Endothall		NA	NA NA	NP	NP	NP	NA	100		NA	NA	100	12,00		1,200	730
Endrin	8081	0.02	0.002403	19	340	1,700	NA	2	8081	0.0500	0.0133	2	180		18	11
Ethylene Dibromide (EDP) (1,2-Dibromomethane)	8260	0.001	0.000315	NP	NP	NP	NA	0.05	8260	1.0000	0.48	0.05	0.17		0.034	0.0065
Ethylene Glycol	8015	NA NA	NA	110,000	110,000	110,000	110,000	NA	8015	NA	NA	32,000	1,200,0	00	120,000	73,000
Fluoranthene	8270	0.033	0.011400	2,400	37,000	290,000	NA	NA	8270	1.0000	0.28	420	22,00		2,300	1,500
Fluorene	8270	0.033	0.007760	2,400	37,000	290,000	NA	NA	8270	1.0000	0.215	630	22,00		2,300	1,500
Glyphosate		NA NA	NA NA	NP	NP	NP	NA	700		NA	NA	700	62,00		6,100	3,700
Heptachlor	8081	0.02	0.002485	1.8	8.9	52	NA	0.4	8081	0.0500	0.0127	0.4	0.38		0.11	0.015
Heptachlor Epoxide	8081	0.02	0.002677	0.81	7	11	NA	0.2	8081	0.0500	0.0136	0.2	0.19		0.053	0.0074
Hexachloro- 1,3 - Butadiene	8270	0.33	0.007630	13	220	170	1,000	NA	8270	10.0000	2.41	NP	22		6.2	0.86
	8270	0.33	0.008330	5.2	28	85	NA	1	8270	10.0000	1.24	1	1.1		0.3	0.042
Hexachlorobenzene Hexachlorocyclopentadiene	8270	0.33	0.036800	NP NP	NP NP	NP	NA	50	8270	10.0000	1.63	50	3,700		370	220
Hexachlorocyclopentagiene Hexachloroethane	8270	0.33	0.007440	63	1,100	8,000	NA	NA	8270	1.0000	0.3	15	120		35	4.8
	8270	0.03	0.007280	11	77	690	NA	NA	8270	1.0000	0.268	0.34	2.1		0.15	0.029
Indeno(1,2,3-c,d)pyrene Isophorone	8270	0.03	0.006040	4,600	4,600	4,600	4,600	NA	8270	10.0000	2.78	1,700	1,800		510	71
Isopropylbenzene (Cumene)	8260	0.001	0.000211	260	260	260	260	NA	8260	1.0000	0.189	1,400	11,000		2,100	680
	8081	0.02	0.002471	8.7	70	420	NA .	0.2	8081	0.0500	0.0124	0.2	2.1		0.52	0.061
	8270	0.330	0.0137	3,100	56,000	61,000	61,000	NA	8270	10.0000	1.07	790	31,000		3,100	1,800
m-cresol (3-Methylphenol)	02/0	0.330	0.0137	0,,00	35,300	,500							,			

Table 3
Environmental Science Corp. Analytical Parameters, Laboratory Reporting Limits, Method Detection Limits, and Ohio VAP and U.S. EPA Regions III, VI, and IX RSL Single Chemical Standards Former Burger King Restaurant - 9615 Buckeye Road

Cleveland, Ohio						Ohio \	/AP					1		USEPA	
				SOIL		00				GW			REGION	III, VI, and IX Combine	d RSLs
Chemicals of Concern	Analytical Method	Reporting Limit	Method Detection Limit	Res. Single	C/I Single	Const. Single	Soil Saturation Standard	MCL	Analytical Method	Reporting Limit	Method Detection Limit	VAP UPUS Standard	SOIL INDUSTRIAL	RESIDENTIAL	TAP WATER
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L		ug/L	ug/L	ug/L	mg/kg	mg/kg	ug/L
Methoxychlor	8081	0.020	0.002417	310	5,600	4,300	NA	40	8081	0.0500	0.0169	40	3,100	310	180
Methylnaphthalene, 1 -	8270	0.330	0.00681	360	360	360	360	NA	8270	1.0000	0.222	1,100	99	22	2.3
Naphthalene	8270	0.033	0.007160	69	150	84	NA NA	NA	8270	1.0000	0.231	67	18	3.6	0.14
Nitrobenzene	8270	0.330	0.007370	27	170	610	1,500	NA	8270	10.0000	2.1	NP	24	4.8	0.12
Nitrosodiphenylamine, n -	8270	0.330	0.008680	1,300	10,000	17,000	NA NA	NA	8270	10.0000	1.71	300	350	99	14
o-cresol (2-Methylphenol)	8270	0.330	0.007550	3,100	56,000	430,000	NA	NA	8270	10,0000	1.28	790	31,000	3,100	1,800
Octyl Phthalate, di(n) -	8270	0.330	0.023000	12	12	12	12	NA	8270	1.0000	0.406	630	NA	NA NA	NA
Oxamyl (Vydate)		n/a	n/a	NP	NP	NP	NA	200		n/a	n/a	200	15,000	1,500	910
p-cresol (4-Methylphenol)	8270	0.330	0.0137	310	5,600	4,300	NA	NA	8270	10.0000	1.07	79	3,100	310	180
Pentachlorophenol	8270	0.330	0.048300	55	280	460	NA NA	1	8270	1.0000	0.298	11	2.7	0.89	0.17
Phenol	8270	0.330	0.00631	15,000	66,000	510,000	NA NA	NA	8270	10.0000	0.59	4,700	180,000	18,000	11,000
Picloram		NA	NA	NP	NP	NP	NA NA	500		NA	NA	500	43,000	4,300	2,600
Polychlorinated Biphenyls	8082	see below	see below	1.2	18	42	NA	0.5	8082	see below	see below	0.5	see below	see below	see below
Aroclor 1016	8082	0.020	0.00198	-	-	-		-	8082	0,5000	0.077	-	21	3.9	0.96
Aroclor 1221	8082	0.020	0.0049			-	-	-	8082	0.5000	0.165	- 1	0.54	0.14	0.0068
Aroclor 1232	8082	0.020	0.00718	-		-	-		8082	0.5000	0.175		0.54	0.14	0.0068
Aroclor 1242	8082	0.020	0.00488		-	-			8082	0.5000	0.099		0.74	0.22	0.034
Aroclor 1248	8082	0.020	0.00272		-		-	-	8082	0.5000	0.039	-	0.74	0.22	0.034
Aroclor 1254	8082	0.020	0.00501		•	-	-	-	8082	0.5000	0.122	-	0.74	0.22	0.034
Aroclor 1260	8082	0.020	0.00282	-	-	-		-	8082	0.5000	0.155		0.74	0.22	0.034
Pyrene	8270	0.033	0.010500	1,800	28,000	220,000	NA	NA	8270	1.0000	0.179	470	17,000	1,700	1,100
Pyridine	8270	0.330	0.050800	63	1,100	8,500	400,000	NA	8270	10.0000	1.17	16	1,000	78	37
Silvex (2,4,5 TP) (2(2,4,5,tirchlorophenoxy)proprionic acid)	8151	0.070	0.00691	500	9,000	6,800	NA	50	8151	2.0000	0.22	50	4,900	490	290
Simazine		NA	NA	NP	NP	NP	NA	4		NA .	NA	4	14	4	0.56
Toxaphene	8081	0.400	0.02156	7.8	59	500	NA	3	8081	0.5000	0.224	3	1.6	0.44	0.061
Trichlorobenzene, 1,2,4-	8270	0.333	0.00659	NP	NP	NP	NA	70	8270	10.0000	1.95	70	99	22	2.3
Trichlorophenol, 2,4,5 -	8270	0.330	0.009120	6,300	110,000	850,000	NA	NA NA	8270	10.0000	1.71	1,600	62,000	6,100	3,700
Trichlorophenol, 2,4,6 -	8270	0.330	0.008870	770	4,400	29,000	NA	NA	8270	10.0000	2.04	120	160	44	6.1
Trihalomethanes, Total		NA	NA	NP	NP	NP	NA	80	ļ	NA NA	NA	80	NA NA	NA NA	NA
Trimethylbenzene, 1,2,4	8260	0.001	0.000170	85	120	35	250	NA NA	8260	1.0000	0.198	140	260	62	15
Trimethylbenzene, 1,3,5	8260	0.001	0.000216	69	95	200	200	NA NA	8260	1.0000	0.196	140	10,000	780	370
Trinitrobenzene, 1,3,5 -	8330	0,5	0.12	1,900	34,000	430	NA	NA	8330	0.5000	0.3258	470	27,000	2,200	1,100
Vinyl Acetate	8260	0.010	0.001549	1,400	2,000	100	2,700	NA	8260	10.0000	1.02	4300	4,100	970	410
Inorganic Analytes		,								400.0000	04.54	46,000			22.000
Aluminum	6010B	5.00	1.57566	NP	NP	NP	NA	NA .	6010B	100.0000	31.51	16,000	990,000	77,000	37,000
Antimony	6010B	1.00	0.51847	30	1,200	390	NA	6	6010B	20.0000	10.37 5.43	10	410	31	15
Arsenic, Inorganic	6010B	1.00	0,27139	6.7	82	420	NA NA	10	6010B	5.0000	1.07	2,000	1.6	0,39	7,300
Barium and Compounds	6010B	0.25	0.0536	15,000	370,000	120,000	NA NA	2,000	6010B	2.0000	0.75	4	190,000	15,000 160	7,300
Beryllium and Compounds	6010B	0.10	0,03767	150	5,100	3,100	NA NA	4	6010B	5.0000	0.75	5	2,000	70	18
Cadmium	6010B	0,25	0.03706	72	2,300	1,600	NA NA	5 NA	6010B 6010B	10.0000	1.97	NP	1,500,000	120,000	55,000
Chromium (III)	6010B	0.50	0.09856	110,000	1,000,000	1,000,000	NA NA	NA NA	7196A	10.0000	2.2	NP NP		0.29	0.043
Chromium (VI)	7196A	2.00	0.1031	230	7,900	13,000	NA NA	100	6010B	10.0000	1.97	100	5.6	0.29 NA	0.043 NA
Chromium (Total)	6010B	0.50	0.09856	NP	NP 00.000	NP 4.000	NA NA	NA	6010B	10.0000	1.06	320	NA 300	23	11
Cobalt	6010B	0.50	0.05324	1,400	23,000	4,000	NA NA	200	335.4	5.0000	1.2	200		1,600	730
Cyanide, Free	335.4	0.250	0.0627	1,500	59,000	39,000	NA NA	4,000	335.4	100.0000	25.3	4,000	20,000	4,700	2,200
Fluorides, Soluble	9056	1.00	0.124	4,500	180,000	120,000	NA NA	4,000	6010	5.0000	1.91	15	61,000 800	4,700	2,200 NA
Lead	6010B	0.25	0,09533	400	1,800	750		2	7470A	0,2000	0.0569	2	34	5.6	0.57
Mercury	7471A	0.02	0.0025	7.6	290	190	NA NA	NA	6010B	20.0000	9.84	320	20,000	1,500	730
Nickel (Soluble Salts)	6010B	1.00	0.49204	1,500	44,000	21,000	NA NA	50	6010B	20.0000	6.54	50		390	180
Selenium and Compounds	6010B	1.00	0.32713	380	15,000	9,700	NA	: 50	00108	20.0000	0.04		5,100	290	100

Table 3

Environmental Science Corp. Analytical Parameters, Laboratory Reporting Limits, Method Detection Limits, and Ohio VAP and U.S. EPA Regions III, VI, and IX RSL Single Chemical Standards
Former Burger King Restaurant - 9615 Buckeye Road
Cieveland, Ohio

Cleveland, Ohio						Ohio V	'AP								USEPA	
				SOIL						GW	-			REGION III	I, VI, and IX Combined	d RSLs
Chemicals of Concern	Analytical Method	Reporting Limit	Method Detection Limit	Res. Single	C/I Single	Const. Single	Soil Saturation Standard	MCL	Analytical Method	Reporting Limit	Method Detection Limit	VAP UPUS Standard		SOIL INDUSTRIAL	RESIDENTIAL	TAP WATER
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L		ug/L	ug/L	ug/L		mg/kg	mg/kg	ug/L
Silver	6010B	0.50	0.16252	380	15,000	9,700	NA .	NA NA	6010B	10.0000	3.25	79		5,100	390	180
Thallium	6010B	1.00	0.2998	6.1	230	1,600	NA NA	2	6010B	20.0000	6	2	-	NA	NA NA	NA NA
Vanadium	6010B	0.50	0.09681	680	26,000	17,000	NA NA	NA	6010B	10.0000	1.94	130	- 1	5,200	390	180
Zinc and Compounds	6010B	1.50	0.44025	23,000	880,000	580,000	NA	NA	6010B	30.0000	8.8	4,700		310,000	23,000	11,000
Compounds Without VAP Standards									,							
2-methylnaphthalene	8270	0.033	0.00669	NP	NP	NP	NA .	NA	8270	1.0000	0.226	NP	ŀ	4,100	310	150
4-chlorotoluene	8260	0.001	0.000321	NP	NP	NP	NA NA	NA	8260	1.0000	0.164	NP	ŀ	72,000	5,500	2,600
Acenaphthylene	8270	0.033	0.0087	NP	NP	NP	NA	NA .	8270	1.0000	0.201	NP	ŀ	NA NA	NA	NA
Benzo(g,h,i)perylene	8270	0.033	0.00897	NP	NP	NP	NA	NA	8270	1.0000	0.27	NP	ŀ	NA NA	NA NA	NA
Methyl butyl ketone (2-Hexanone)	8260	0.010	0.001953	NP	NP	NP	NA NA	NA	8260	10.0000	1.57	NP	- 1	1,400	210	47
n-butyl benzene	8260	0.001	0.00024	NP	NP	NP	NA NA	NA	8260	1.0000	0.227	NP	-	NA NA	NA NA	NA .
n-propyl benzene	8260	0.001	0.000199	NP	NP	NP	NA	NA	8260	1.0000	0.22	NP	-	NA NA	NA	NA
Phenanthrene	8270	0.033	0.00849	NP	NP	NP	NA	NA	8270	1.0000	0.139	NP	-	NA NA	NA NA	NA
p-isopropyltoluene	8260	0.001	0.000174	NP	NP NP	NP	NA	NA	8260	1.0000	0.213	NP		NA NA	NA NA	NA
Sec-butyl benzene	8260	0.001	0.0002	NP	NP	NP	NA	NA	8260	1.0000	0.22	NP	ŀ	NA NA	NA NA	NA
Tert-butyl benzene	8260	0.001	0.000186	NP	NP	NP	NA	NA	8260	1.0000	0.196	NP		NA	NA	NA
Total Petroleum Hydrocarbons																
TPH - G	8015	0.1	0.041	NA	NA	NA	5,000	NA	NA	100.0000	30.58	NP	-	NA NA	NA .	NA
TPH - D	8015	4	0.9319	NA	NA	NA	10,000	NA NA	NA .	100.0000	33	NP		NA NA	NA NA	NA NA
TPH - O	8015	4	0.9319	NA	NA	NA	20,000	NA	NA	100.0000	33	NP		NA NA	NA	NA

NP - No VAP generic numerical standards or soil saturation limits have been established for these compounds. USEPA RSLs may be used for single chemical action levels.

The Residential Single TPH standards are the BUSTR Action levels for Class 2 Soils (silts and clays).

The Construction Single TPH standards are the VAP Soil saturation Concentrations for Silty/Clayey/Sands soil.

NA - Not Applicable.

RSL = Regional Screening Level

Please note change in method

\*\* MDLs are subject to change with annual update

Table 4
Field Equipment Maintenance Procedures and QA Objectives
Former Burger King Restaurant – 9615 Buckeye Road
Cleveland, Ohio

Instrument	Maintenance Procedures/Schedule	Precision	Accuracy	Completeness
Photoionization or Flame-ionization Detector	<ol> <li>Calibrate beginning and end of each day and as necessary during use.</li> <li>Check battery and recharge when low.</li> <li>Clean lamp window every 24 hours of operation.</li> <li>Replace dust filter every 240 hours of operation.</li> <li>Replace sample pump every 5000 hours of operation.</li> </ol>			
Horiba U-10 pH/Dissolved Oxygen/Total Dissolved Solids/Temperature/ Specific Conductivity Meter	<ol> <li>Calibrate beginning/end of each day and as necessary during use.</li> <li>Rinse probe after each measurement.</li> <li>Replace electrodes as needed.</li> <li>Check redline and replace batteries if does not calibrate.</li> </ol>	+/- 0.1 S.U (pH) +/- umhos/cm (Cond)	0.05 S.U. (pH) +/- 10 uhmos/cm	90%
Fluid Level Indicator	<ol> <li>Decontaminate at the beginning and end of each day, and between measurement locations.</li> <li>Replace batteries as needed.</li> </ol>	+/- 0.01 ft	0.005 ft	90%

Table 5 Sample Preservation and Hold Times – Solid and/or Waste Samples Former Burger King Restaurant – 9615 Buckeye Road Cleveland, Ohio

	Reference Method	Technique	Container	Preservation and Storage	Holding Time Extract <sup>1</sup>	Analyze <sup>2</sup>
Total Petroleum Hydrocarbons	EPA 8015DRO	GC/FID	4 oz. glass jar	Refrigerate at 4°C	14 days	40 days
Total Petroleum Hydrocarbons	EPA 8015GRO	GC/FID	4 oz. glass jar	Refrigerate at 4°C		14 days
Volatile Organics (low concentration)	EPA 8260B	GC/MS	40 ml VOA vial	Sodium bisulfate; Refrigerate at 4°C	· NA	14 days**
Volatile Organics (low concentration)	EPA 8260B	GC/MS	Encore sampler	Refrigerate at 4°C	N/A	48 hours**
Volatile Organics (high conc.)	EPA 8260B	GC/MS	40 ml VOA vial	Methanol; Refrigerate at 4°C	NA	14 days**
Volatile Organics (high conc.)	EPA 8260B	GC/MS	40 ml VOA vial	Refrigerate at 4°C	N/A	14 days**
Volatile Organics	EPA 8260A	GC/MS	4 oz. glass jar	Refrigerate at 4°C	NA	14 days**
Formaldehyde	EPA 8315	HPLC	4 oz. glass jar	Refrigerate at 4°C	NA	14 davs**
Semi-Volatile Extractable Organics	EPA 8270C	GC/MS	4 oz. Glass jar	Refrigerate at 4°C	14 days	40 days**
Aromatic Volatile Organics	EPA 8021	GC/PID	4 oz. glass jar	Refrigerate at 4°C	NA	14 days**
Phenois	EPA 8270C	GC/MS	4 oz. glass jar	Refrigerate at 4°C	14 days	40 days
Organochlorine Pesticides & PCBs	EPA 8081/8082	GC/ECD	4 oz. glass jar	Refrigerate at 4°C	14 days	40 days
Polynuclear Aromatic Hydrocarbons	EPA 8100 or EPA 8310 or EPA 8270	GC/FID HPLC GC/MS	4 oz. glass jar	Refrigerate at 4°C	14 days	40 days
Chlorinated Hydrocarbons	EPA 8120	GC/ECD	4 oz. glass jar	Refrigerate at 4°C	14 days	40 days
Metals: Cd, Cr, Pb, Mn, Ba, Si, Fe, Al, Sb, Be, Co, Cu, Mo, Ni, Ag, Tl, V, Zn	EPA 6010B	ICP Atomic Emission Spectroscopy	4 oz. glass jar or plastic bottle	Refrigerate at 4°C	NA	6 months
Arsenic Selenium Mercury	EPA 7060 EPA 7740 EPA 7471A	Furnace AA Furnace AA Cold Vapor AA	4 oz. glass jar	Refrigerate at 4°C	NA NA NA	6 months 6 months As soon as possible**
pH	EPA 7421A EPA 9045	Furnace AA Electrometric	4 oz. glass jar	Refrigerate at 4°C	NA NA	6 months Analyze immediately

<sup>\*\*</sup>These samples should be shipped within 24 hours of collection.

NA = Not applicable + Preserve for Aromatics only; 7 days if no HCl.

TABLE 5 (cont.) - Sample Preservation and Hold Times - Water Samples

Parameter	Reference Method	Technique	Container	Preservation and Storage	Holding Time Extract <sup>1</sup>	Analyze <sup>2</sup>
Total Petroleum Hydrocarbons	EPA 418.1	IR	1 L glass bottle	Refrigerate at 4°C	7 days	40 days
Total Petroleum Hydrocarbons – Diesel Range	EPA 8015DRO	GC/FID	1 L glass bottle	Refrigerate at 4°C	14 days	40 days
Total Petroleum Hydrocarbons – Gasoline Range	EPA 8015GRO	GC/FID	2 x 40 mL VOA vials	Refrigerate at 4°C	NA	14 days
Volatile Organics	EPA 8260B EPA 624	GC/MS	2 x 40 mL VOA vials	Refrigerate at 4°C HCL pH<2	NA	14 days**+
Volatile Organics including THMs	EPA 524.2	GC/MS	2 x 40 mL VOA vials	Sodium bisulfate; Refrigerate at 4°C	NA	14 days**+
Haloacetic Acids	EPA 552.2	GC/ECD	250mL amber glass jar	Ammonium Chloride: Refrigerate at 4°C	7 days at 4°C or 14 days at –10°C	14 days
Semi-Volatile Extractable Organics	EPA 8270C EPA 625	GC/MS	1 L glass bottles; TFE-lined cap	Refrigerate at 4°C	7 days**	40 days
Aromatic Volatile Organics	EPA 8021 EPA 602	GC/PID	2 x 40 mL VOA vials	Refrigerate at 4°C HCl pH <2	NA	14 days**+
Phenols	EPA 8040 EPA 604	GC/FID	1 L glass bottle; TFE-lined cap	Refrigerate at 4°C	7 days**	40 days
Organochlorine Pesticides & PCBs	EPA 8081/8082 EPA 608	GC/ECD	1 L amber glass bottle; TFE-lined cap	Refrigerate at 4°C	7 days**	40 days
PCBs	EPA 608	GC/MS	1 L amber glass bottle; TFE-lined cap	Refrigerate at 4°C	7 days**	40 days
Polynuclear Aromatic Hydrocarbons	EPA 8310 or EPA 8100 or EPA 8270	HPLC GC GC/MS	1 L glass bottle; TFE-lined cap	Refrigerate at 4°C	7 days**	40 days
Metals	EPA 6010 EPA 200.7	ICP	500 mL plastic bottle	HNO₃ pH<2	NA	6 months
Drinking Water Metals	EPA 200.7, 200.9, 245.2	ICP	500 mL plastic bottle	HNO₃ pH<2	NA	6 months
Drinking Water Metals	SM 3113-B	Furnace AA	500 mL plastic bottle	HNO₃ pH<2	NA	6 months
Arsenic	EPA 7060 EPA 206.2	Furnace AA	500 mL plastic bottle	HNO₃ pH<2	NA	6 months
Selenium	EPA 7740 EPA 245.1	Furnace AA	500 mL plastic bottle	HNO₃ pH<2	NA	6 months
Mercury	EPA 7470 EPA 245.1	Cold Vapor AA	500 mL plastic bottle	HNO₃ pH<2	NA	28 days-glass 13 days-plastic
Lead	EPA 7421 EPA 239.2	Furnace AA	500 mL plastic bottle	HNO₃ pH<2	NA	6 months
Chromium (VI)	EPA 218.4	Colorimetric	125 mL plastic bottle	Refrigerate at 4°C	NA	24 hours**
Sulfide	EPA 376.1	wc	500 mL plastic bottle	Refrigerate at 4°C NaOH pH >12	NA	7 days**
Cyanide	EPA 9012 EPA 335.4	Colorimetric	250 mL plastic bottle	Ascorbic Acid; Refrigerate at 4°C; NaOH pH >12	NA	14 days**

<sup>\*\*</sup>These samples should be shipped within 24 hours of collection. + Preserve for Aromatics only; 7 days if no HCl.

NA = Not applicable

TABLE 5 (cont.) – Sample Preservation and Hold Times – Water Samples

Parameter	Reference Method	Technique	Container	Preservation and Storage	Holding Time Extract <sup>1</sup>	Analyze <sup>2</sup>
Chloride	EPA 325.1 SM4500CI-B	WC ·	250 mL plastic bottle	Refrigerate at 4°C	NA	28 days
Chlorine	SM4500CI-G	WC	125 mL plastic bottle	Refrigerate at 4°C	NA	24 hours
Fluoride	EPA 340.2 SM4500F-C	WC	250 mL plastic bottle	Refrigerate at 4°C	NA	28 days
Sulfate	EPA 375.4	WC	250 mL plastic bottle	Refrigerate at 4°C	NA	28 days
Sulfate	SM4500SO <sub>4</sub> -D	Gravimetric	1 L plastic bottle	Refrigerate at 4°C	NA	28 days
Nitrate	EPA 353.2 SM4500 NO3-F	wc	250 mL plastic bottle	Refrigerate at 4°C H₂SO₄ pH<2	NA	28 days
Nitrite	EPA 354.1 SM4500 NO3-F	WC	250 mL plastic bottle	Refrigerate at 4°C	NA	48 hours
Nitrate/Nitrite	EPA 353.3	wc	250 mL plastic bottle	Refrigerate at 4°C; H₂SO₄ pH<2	NA	28 days
Total Phenolics	EPA 9066 EPA 420.2	WC	1 L glass only	Refrigerate at 4°C; H <sub>2</sub> SO <sub>4</sub> pH<2	NA	28 days
Phosphate	SM4500P-F	Colorimetric	250 mL plastic bottle	Refrigerate at 4°C; H <sub>2</sub> SO <sub>4</sub> pH<2	NA	28 days
Ortho-Phosphate	SM4500P-F	Colorimetric	250 mL plastic bottle	Refrigerate at 4°C	NA	48 hours
Total Organic Carbon/Dissolved Organic Carbon	EPA 415.1 EPA 9060 SM5310-C	Oxidation/ NDIR	3 x 40 mL VOA vials	Refrigerate at 4°C; H₂SO₄ pH<2	NA	28 days
Petroleum Hydrocarbons	EPA 418.1	IR	1 L glass bottle	Refrigerate at 4°C; HCI pH<2	NA	28 days
рН	EPA 9040 EPA 150.1 SM4500-H+	Electrometric	125 mL plastic bottle	Refrigerate at 4°C	NA	Analyze immediately*
Conductance	EPA 9050 EPA 120.1	Wheatstone Bridge	125 mL plastic bottle	Refrigerate at 4°C	NA	28 days
Chemical Oxygen Demand	EPA 410.4	Colorimetric	125 mL plastic bottle	Refrigerate at 4°C; H₂SO₄ pH<2	NA	28 days
Oil & Grease	EPA 413.1 EPA 1664	Gravimetric IR	1 L glass bottle	Refrigerate at 4°C; H <sub>2</sub> SO <sub>4</sub> pH<2	NA	28 days
Total Dissolved Solids	EPA 160.1 SM2540-C	Gravimetric	250 mL plastic bottle	Refrigerate at 4°C	NA	7 days**
Total Suspended Solids	EPA 160.2	Gravimetric	250 mL plastic bottle	Refrigerate at 4°C	NA	7 days**
Turbidity	EPA 180.1	Turbidimetric	125mL plastic bottle	Refrigerate at 4°C	NA	2 days
Hardness	EPA 130.2	Titration	250mL plastic bottle	Refrigerate at 4°C; HNO₃ pH<2	NA	180 days
Alkalinity	EPA 310.2 SM 2320	Colorimetric	250 mL plastic bottle	Refrigerate at 4°C	NA	14 days**

<sup>\*\*</sup>These samples should be shipped within 24 hours of collection. + Preserve for Aromatics only; 7 days if no HCI.

NA = Not applicable

# TABLE 5 (cont.) – Sample Preservation and Hold Times – Air Samples

Parameter	Reference Method	Technique	Container	Preservation and Storage	Holding Time Extract <sup>1</sup>	Analyze <sup>2</sup>
Volatile Organics	EPA TO-15	GC/MS	SUMMA Canister	Ambient Temperature	14 days	10 days
Volatile Organics	EPA TO-15	GC/MS	Tedlar Bags	Ambient Temperature	48 hours	36 hours

## **Toxicity Characteristic Leaching Procedure (TCLP) Samples**

Parameter	Reference Method	Technique	Container	Preservation and Storage	Holding Time Extract	Analyze
TCLP Leachate	EPA 1311 Leaching Procedure	Zero head space rotary extraction	1 L glass (refer to determinative procedure for additional required volumes)	Refrigerate at 4°C	7 days to leach; refer to determinative procedure to perform extract	Refer to determinative procedure
Ortho-phosphate	EPA 365.1	Colorimetric	250mL plastic bottle	Refrigerate at 4°C	NA	48 hours
Total phosphorus	EPA 365.1	Colorimetric	250mL plastic bottle	Refrigerate at 4°C; H <sub>2</sub> SO <sub>4</sub> pH<2	NA .	28 days

### Minimum Sample Volumes Required for TCLP Extraction

Matrix	Metals	Volatiles	Semi-volatiles	Pesticides/Herbicides	Full TCLP
Aqueous with <0.5% solids	500 mL	4 x 40 mL	1 Liter	1 Liter	3 Liters
Solvent/Oil*	2 Liters	500 mL	2 Liters	2 Liters	6 Liters
Sludge/Soil	500 mL	125 mL	1 Liter	1 Liter	2 Liters
Solid**	150 g	50 g	150 g	150 g	200 g

<sup>\*</sup>Depending upon the % solids, this sample matrix may result in a multiple phase leachate. \*\*This category would include any non-filterable waste (i.e., rags or bag filters).

# APPENDIX A STANDARD OPERATING PROCEDURES (SOPs)

SOP No. 001:	Sampling Procedures for Groundwater Monitoring Wells
SOP No. 003:	Development of Wells Using Surging Techniques
SOP No. 004:	Soil Description (Unconsolidated Material)
SOP No. 005:	Sampling Equipment Decontamination
SOP No. 006:	Quality Assurance/Quality Control Samples
SOP No. 007:	Headspace Screening for Volatile Organic Compounds
SOP No. 008:	Fluid Level Measurements in Groundwater Monitoring Wells
SOP No. 009:	Drilling Equipment Decontamination
SOP No. 010:	Design and Installation of Single-Cased Monitoring Wells
SOP No. 012:	Geoprobe Sampling of Soils
SOP No. 013:	Surveying
SOP No. 014:	Split Spoon Sampling of Soils
SOP No. 019:	Chain-of-Custody Procedures
SOP No. 024:	Management of Investigation Derived Wastes
SOP No. 027:	Shipping Environmental Samples
SOP No. 029:	Soil sampling With Encore® Sampler (or Method 5035 Equivalent)
SOP No. 031:	Calibration of Thermo Environmental 580-B Photoionization Detector
SOP No. 032:	Water Meter Operations
SOP No. 035:	Low Flow Sampling for Groundwater Monitoring Wells
SOP No. 041:	Soil Vapor Sampling Procedures

**FSOP No.: 001** Rev. No.:02

Title: Sampling Procedures for Groundwater Monitoring Wells

Approved by: Dan B. Brown, CPG

Date: 02/21/11

#### SUMMARY

- 1. Obtain well numbers(s), well diameter, total depth of well (s), and top of casing elevation and other requirements from the Project Manager
- 2. Assemble essential sampling equipment.
- 3. Once onsite, **note condition of each well** and enter information on Groundwater Sampling Log.
- 4. **Measure water level** to nearest 0.01 feet with a water level indicator: measure nonaqueous liquid, if present, with an interface probe.

If necessary, determine the depth of the bottom of the well from the measuring point (e.g., top of casing).

Do not purge or sample a well if a measurable thickness of non-aqueous liquid is present in the well.

Decontaminate all measuring devices immediately after each use.

- 5. Prepare site for sampling.
- 6. **Purge groundwater** using either a disposable bailer or a pump.
- 7. **Measure temperature, pH, conductivity, and dissolved oxygen** (if required) periodically during purging and record on the Groundwater Sampling Log.
- 8. **Collect ground water samples** and prioritize based upon the analyte's stability.
- 9. Based on project objectives, collect quality assurance/quality control (QA/QC) samples.
- 10. Filter and preserve the sample aliquots, as necessary.
- 11. Complete Chain-of-Custody form.
- 12. Shipment of Environmental Samples.

#### PROCEDURES FOR SAMPLING MONITORING WELLS

- 1. Prior to sampling, **obtain the following information:** the well number (s), well diameter, total depth of the well(s), the top of casing elevation for the well(s), and other pertinent information. This information will be supplied by the Project Manager (PM) as part of the Sampling and Analysis Plan (SAP) and should be entered onto the Groundwater Log. This information is needed to determine the amount of liquid to remove from the well(s) to obtain a representative groundwater sample. If this information is not available, measure the well casing diameter and total well depth prior to sampling. Do not use a water level recorder or interface probe to determine the total well depth; use a decontaminated tape measure or a new, clean weighted line.
- 2. Prior to leaving the office, assemble all of the essential equipment, including sample bottles, to complete sample collection. The sample bottles, and labels, are available from the Partners laboratory coordinator or contract laboratory. Sampling of monitoring wells can be accomplished with various methods and collection devices. Refer to site specific SAP for methods and collection devices to be used. A general summary of monitoring well sampling equipment is provided below:

Disposable polyethylene bailers are to be removed from wrapper and used ONCE per well, then disposed with PPE from the site. Reusable bailers (stainless steel, etc.) are to be appropriately decontaminated in accordance with FSOP NO. 005 prior to and/or after each use between sampling events. New, clean cord shall be utilized for each bailer per well, with used cord removed and disposed with PPE from the site. Low flow sampling (peristaltic pump, bladder pump etc.) is to be conducted using new, clean polyethylene and/or silicone tubing for each well, with used tubing removed after sampling and disposed with PPE from the site. Refer to U.S. EPA Region 1 SOP No. GW0001 for more information regarding low flow sampling techniques.

- 3. Once at the site, **inspect each well.** Note abnormalities including, but not limited to: is the well locked, is the well top cracked or broken, if the well has casing above ground, is the casing still upright or is it bent due to contact with vehicles or machinery, is the casing intact or broken? Note the well condition on Groundwater Sampling Log. Notify the PM of any suspicious or unusual conditions.
- 4. **Measure water level and non-aqueous liquid thickness** to nearest 0.01 feet. Measure water level with a water level indicator, measure non-aqueous liquid thickness with an interface probe. Record result on Groundwater Sampling Log. (Record measurements even if the well will not be sampled due to presence of non-aqueous liquid.) The interface probe should not be used in wells that are not suspected or demonstrated to contain free product. Attempt to gauge wells not suspected of containing non-aqueous liquid first. Utilize appropriate gauging techniques depending on whether non-aqueous liquid is heavier or lighter than water. Decontaminate the water level meter and interface probe with distilled water and a non-phosphate detergent solution and rinse with distilled water, between wells or anytime the equipment is used in wells containing non-aqueous liquids. **If well is dry, note on Groundwater Sampling Log.**

Do not purge or sample a well, if a measurable thickness of non-aqueous liquid is present. However, if a sheen (i.e., non-measurable thickness) of non-aqueous liquid is present, the well should be sampled.

- 5. **Prepare site for sampling** by making a clean sampling environment. This should be accomplished by placing clean plastic on the ground at the well to prevent any sampling equipment (including sample bottles, bailers, bailer cord, instruments, etc.) from being cross-contaminated. Also put on protective gloves and other protective clothing as may required by the Health and Safety Plan.
- 6. To obtain a representative sample from the well, it is necessary to **remove (purge)** the **equivalent of three well volumes of liquid** from the well or the well will be purged in accordance with site-specific requirements (e.g., low flow sampling, SAP,etc.)To determine how many gallons of water need to be purged, calculate well volume using the equations and conversion factors found on the Groundwater Sampling Log. Once the amount of liquid to be removed has been determined begin purging.

If the well goes dry during purging, begin sample collection when there is sufficient water in the well to meet the analytical requirements or after the well recovers to within 10% of its static condition.

FSOP 001 Page 2 of 4

Purging may be accomplished by using a bailer or a pump. Liquid removed from the wells must be contained prior to disposal; liquid may be discharged onto the ground only when analytical results confirm that no contaminants are present and when the client approves discharge to the ground. Where prior written permission has been granted by the applicable responsible agency, purge water may be disposed in a sanitary (not storm) sewer. If there is any question regarding disposal, contain the liquid in a closed-head, 17E 55-gallon drum. Leave a minimum three-inch headspace in the drums to allow for expansion of liquid in summer and freezing in winter. **Drums should be labeled as non-hazardous** (green and white labels); information to be included on the label include the date, location, well number, and type of media (purge or development water). Drums should be grouped and staged in a safe, well-lighted area where they will not be disturbed or hit by vehicles. Drums should also be staged in an area easily accessible to a truck.

7. Measure temperature, pH, and conductivity of the groundwater from the first pump stoke or first bailer volume; a clean container may be used to hold the liquid emptied from the pump or bailer to conduct measurements. It is usually easier to record temperature and conductivity first, followed by pH. Empty the container into another container, bucket, or drum; rinse the container with distilled water in anticipation of the next well volume sample.

For some projects, it may be necessary to measure dissolved oxygen. While a downhole dissolved oxygen measurement is preferred, equipment and well limitations may require completing this measurement at the surface. If dissolved oxygen measurements are made, complete them before taking other field measurements.

Measure the temperature, pH, and conductivity approximately every half well-volume during purging. Record the values on the Groundwater Sampling Log. If the values are stable (within 10%) after three (3) well volumes, sample collection may begin. If the values are not stable, keep purging until the values become stable, but do not remove more than five (5) well volumes. If stability is not reached, note on the Groundwater Sampling Log. Once stability has been reached (after three [3] well volumes are purged) or a maximum of five (5) well volumes are removed, collect the groundwater sample.

8. Groundwater sample collection should be initiated within three (3) hours of completing well purging. If the well (s) is slow to recharge, it may take several hours longer to collect enough sample (s) for analysis. If enough sample volume is not available for collection of all sample parameters, collect samples in order of their volatility, as soon as sufficient volume is available.

Collect samples in the order of priority listed below. This priority is based on the stability of the analytes when the groundwater sample is exposed to air, atmospheric pressure, and temperature.

Dissolved oxygen

Volatile (purgeable) organics [Method 8240, 8260, 8010, 8021, 8015 (gasoline), 601, 602, 624]

(use only a bailer or low-flow rate pumping technique to obtain samples)

Total organic carbon

Total organic halogens

Temperature, pH, conductivity

Extractable (semi-volatile) organics [Methods 8270, 8015, (diesel), 625, 8100]

Total metals (Methods 6010 ICP, 7000 series)

Dissolved metals (Methods 6010 ICP, 7000 series)

PhenoIs

Cyanide

Sulfates

**Turbidity** 

Nitrates and ammonia

Radionuclides.

Enter information about sample containers and analytical requirements on Groundwater Sampling Log.

- **9.** For quality assurance/quality control (QA/QC) purposes and according to the project objectives, **QA/QC** samples should be prepared or collected. Refer to FSOP No. 006 for more information about QA/QC samples.
- 10. Filter and preserve the sample aliquots, as necessary. Sample filtration should be completed by using the in-line filtering method. The in-line filtering methods use positive pressure provided by a sampling pump to force the sample through an attached filter. Typically, a factory cleaned, 0.45 micron filter is attached to a disposable bailer and a vacuum hand pump is used to force the sample through the filter. Filtration and preservation should be completed at the well or at another on-site location, if possible. Enter filtration and preservation information on Groundwater Sampling Log. Sample filtering should only be conducted in accordance with approved regulatory agency guidance or in accordance with site-specific requirenments, but not a standard protocol.
- 11. Complete the Chain-of-Custody Form, including all dates and times of samples collected. Include blanks and duplicate samples on this form.
- 12. Shipment of Environmental Samples should be conducted in accordance with FSOP 027.

**FSOP No.: 003** Rev. No.: 0

Title: Development of Wells Using Surging Techniques

Approved by: Dan B. Brown, CPG

Date: 10/14/02

#### **SUMMARY**

**NOTICE:** This procedure should be used for all well, except those capable with greater than a 5 gallon per minute sustained yield.

- 1. Measure water level (and non-aqueous liquid level, if applicable) to the nearest 0.01 foot.
- 2. Record water and non-aqueous liquid level measurements on Well Development Log.
- 3. **Develop least-contaminated well(s) first.** Do not develop a well that contains measurable thickness of non-aqueous liquid.
- 4. Surge vigorously with a bailer or surge block. Remove water that contains following each surging cycle.
- 5. Fill a glass with discharge water, check for solids and measure temperature, pH, and conductivity and record on Well Development Log.
- 6. Continue surging and monitoring discharge water until the water is relatively free of Sediment.
- 7. Record the volume of water discharged on Well Development Log.

#### PROCEDURE FOR DEVELOPMENT OF WELLS BY SURGING

**NOTICE:** This procedure should be used for all wells, except those capable with greater than a 5 gallon per minute sustained yield.

- 1 **Measure water level** (and non-aqueous liquid level, if applicable) to the nearest 0.01 foot, decontaminating the water level probe before and after use with distilled water (and phosphate-fee detergents, if available). Record water level measurements in field notes or Field Activity Log.
- 2 Develop least-contaminated well (s) first. If a measurable thickness of non-aqueous liquid is present, do not develop the well.
- 3 **Using a bailer or surge block vigorously surge the well.** This technique is most effective when the bailer or surge block is placed across screened interval. If a surge block is used, test to determine that there is free movement of the block before it is moved down across the screened interval. The block should move relatively easily. Excess force used to move the block may result in damage to the screen.
- 4 After a surging cycle is complete remove water and sediment from the well.
- 5 Periodically fill a glass jar with discharged water and allow the sediment to settle to **estimate the amount of silt and fine sand suspended in the water.** Measure temperature, pH, and conductivity and record on Well Development Log.
- 6 Contain development water in closed-head, 17E 55–gallon drums. If prior written permission has been granted by the applicable responsible agency, development water may be disposed in a sanitary (not storm) sewer. Leave a minimum three-inch headspace in the drums to allow for expansion of liquid in summer and freezing in the winter. Drums should be labeled as non-hazardous (green and white labels available from the PARTNERS sample coordinator). Drums should be grouped and staged in safe, well-lighted areas where they will not be disturbed or hit by vehicles. Drums should be staged in an area easily accessible to a truck.
- 7 Continue development until the water is relatively free of sediment.
- 8 **If a pump is used to evacuate development water,** when finished pumping pull hose from the well while the pump is still running to **prevent water from returning to well casing.**
- 9 Decontaminate bailer, surge block, and pump.
- 10 **Record total volume of water removed from well,** approximate amount of time for water level to recover, and other pertinent field observations on the Well Development Log.

FSOP 003

**FSOP No.: 004**Rev. No.: 0

Title: Soil Description (Unconsolidated Material)

Approved by: Dan B. Brown, CPG

Date: 10/14/02

#### **SUMMARY**

The following outline is provided for use as a guide for preparing soil and rock descriptions for samples collected during drilling, Geoprobe™ sampling, hand angering, etc. Sample descriptions are to be put on the Drilling Log.

These guidelines are consistent with the Unified Soil Classification System (USCS), but are simplified to eliminate information that is not normally required for environmental studies.

The soil descriptions should follow the outline, naming the characteristics in the order listed. It is possible that one or more of the eight categories listed would not be useful in describing particular soil or rock samples. If this is the case, simply do not use the category in the description of that sample description.

The USCS uses a two-letter shorthand classification system to identify unconsolidated (soil) materials. After developing the soil description determine the USCS classification.

#### PROCEDURES FOR SOIL AND ROCK DESCRIPTION

#### 1. Color

If more than one color is appropriate, list the primary color first. Include the adjective "mottled" or "banded," if appropriate

#### 1. Structure

If appropriate, adjectives such as these may be used to describe soil or rock structures. The following list a few of the more likely to be used structural terms.

- 1. Stratified having distinct layers of different soil material (e.g. sand and clay)
- 2. Lensed having small lenses of a different soil material
- 3. Varved having distinct but very thin layers of the differing color clay
- 4. Fractured broken or cracked in a direction different than bedding direction
- 5. Bedded having distinct layers of same or different rock material (e.g. shale and limestone)
- 6. Fossilifeous contains numerous fossils

#### 2. Composition

A. Major Constituent – use all capital letters.

Gravel; sand; silt; clay; sandstone; limestone; shale; gneiss; schist; slate; marble; basalt; granite; etc. List this constituent first. Major constituents should make up >30% of the sample by weight. If two major constituents are present, they should be separated by "and" i.e., SAND and GRAVEL. For gravel and sand it may be appropriate to use a descriptive adjective (e.g., fine, coarse, medium, etc.) to describe the size of the major constituent.

#### B. Minor Constituents – do not use capital letters

Use "with" for constituents making up 15% to 29% of composition by weight.

Use "trace" for constituents making up 8% to 14 % of composition by weight.

Use "noted" for constituents making up <8% of composition by weight.

#### 3. Fill Material

If the material is fill rather than natural, the word (fill) should be enclosed with parentheses.

#### 4. Relative Moisture Content

Dry – appropriate for soil, which is noticeably below optimum moisture.

Moist – soil near optimum moisture but obviously less than the liquid limit.

Wet - moisture content near or exceeding the liquid limit.

#### 5. Relative Density or Consistency

#### **Coarse Grained Soils**

- Very Loose
- Loose
- Medium Dense
- Dense
- Very Dense

#### **Fine Grained Soils**

- Soft
- Medium Stiff
- Stiff
- Very Stiff
- Hard

#### 7. Other Comments

Petroleum or other odor, sheen on water or sample, water on rods, bottom of borehole, roots, burrows, etc.

#### 8. USCS Classification System

The Unified Soil Classification System (USCS) uses a letter short hand to describe soil material. The first letter represents the principal composition [i.e., gravel (G), sand (S), silt (M), and clay (C)]. The second letter provides additional information, including uniformity of grain size, mixtures, and plasticity. Listed below are the principal USCS short hands to be used. The USCS should be determined after the complete sample description is developed. An USCS should not be applied to a rock sample.

- GW Well graded (i.e., non-uniform size) gravel, or non-uniform and sand and gravel mix with little clay or silt
- GP poorly graded (i.e.. uniform size) gravel, or uniform sand and gravel mix with little clay or silt
- GM silty gravel, or sand/gravel/silt mixture
- GC clayey gravel, or sand/gravel/clay mixture
- SW well graded (i.e.. non-uniform size) sand, gravely sand with little clay or silt
- SP poorly-graded (i.e., uniform size) sand, or gravelly sand with little clay or silt
- SM silty sand, or silt/sand mixture
- SC clayey sand, or sand/clay mixture
- ML silt, or silty/very fine sand, or silty/clayey fine sand, or clayey silt
- CL slightly plastic clay, or silty/sandy/gravely clay
- CH plastic clay

#### Some description examples:

Black CINDERS (fill) with brown sandy clay, trace brick fragments, dry medium dense (GP)

Mottled brown and gray CLAY, with organic matter (fill), moist, soft (CL)

Brown and gray, banded, fine SAND, with silt and clay, trace mica flakes, loose, saturated (SP)

Brown CLAY, trace sand, moist, stiff (CL)

Mottled brown and gray CLAY, trace silty, trace gravel, moist, stiff (CL)

Gray coarse SAND and GRAVEL, loose, saturated, sheen on water, petroleum odor (GW)

FSOP 004

Title: Sampling Equipment Decontamination

Approved by: <u>Dan B. Brown, CPG</u> Date: <u>10/14/02</u>

#### **SUMMARY**

- 1. Prepared decontamination supplies.
- 2. Put on gloves and other protective clothing.
- Remove dirt and other gross contamination. A non-phosphate detergent and water solution may be used.
- 4. Rinse the sampling equipment with deionized water and other solutions, as required.
- 5. Let air dry and wrap in aluminum foil.
- 6. Collect all wastes for proper disposal.

#### PROCEDURES FOR DECONTAMINATION SAMPLING EQUIPMENT

- 1. Obtain all necessary decontamination supplies, including brushes, bowls or buckets; decontamination solutions; squeeze bottles; etc., and prepare a decontamination line. Place decontamination stations on a plastic liner to prevent spillage.
- 2. Put on gloves to protect hands during decontamination. Protective clothing may also be necessary in some instances (refer to Health and Safety plan for requirements).
- **3.** Remove all dirt and gross contamination from the sampling tools and equipment using a clean, stiff-bristle brush. Remove dirt using a phosphate-free detergent and tap water solution.
- 4. Following removal of all dirt, **rinse all sampling equipment** with the following solutions in the following order, unless the Project Manager stipulates a different requirement:

Deionized water or tap water.

Dilute hydrochloric acid (for metal sampling equipment) or dilute nitric acid (for nonmetal sampling equipment), if analytical program includes metal.

Deionized water.

Methanol rinse (only if organics will be analyzed).

Deionized water

Air dry.

Some steps in this process may be eliminated, if a full suite of metal and organic analytes are not being determined. At a minimum, the sampling equipment must be rinsed with deionized water following removal of gross contamination with a soapy water rinse.

- 5. If the sampling equipment will not be immediately used after decontamination, wrap in aluminum foil to prevent contamination.
- 6. Collect all waste materials generated during decontamination for proper disposal.

**FSOP No.: 006**Rev. No.:0

Title: Quality Assurance/Quality Control Samples

Approved by: Dan B. Brown, CPG Date: 10/14/02

#### SUMMARY

1. Determine the type, number, and frequency of quality assurance/quality control (QA/QC) samples to be collected or prepared. The Project Manager (PM) will select the QA/QC requirements based on project objectives and budget. QA/QC samples may include: 1) trip blanks; 2) field blanks; 3) equipment blanks; 4) replicate samples; and 5) matrix spike/matrix spike duplicates.

- 2. Obtain necessary materials (i.e., glassware, specially prepared water) from contract laboratory.
- 3. Prepare the required QA/QC samples and complete the Chain-of-Custody forms.

#### PROCEDURES FOR QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

1. On the basis of the objectives and budget of the project, the Project Manager (PM) will determine the type, number, and frequency of the collection or preparation of quality control/quality assurance (QA/QC samples. One or all five (5) different types of QA/QC samples may be required. The QA/QC samples are: 1) trip blanks; 2) field blanks; 3) equipment blanks; 4) replicate samples; and 5) matrix spike/matrix spike duplicates.

A 'trip blank" sample consists of organic free, distilled water that is sealed in clean sample containers by the PARTNERS laboratory coordinator or the contract laboratory and is transported with the empty sample bottles to the sampling site. The trip blank is returned, unopened to the laboratory with the collected samples for analysis. The trip blank is analyzed to determine if the field samples may have been subjected to contamination during transport. Normal practice requires preparation of one trip blank per cooler shipped to the laboratory. As an alternative, one trip blank should be prepared per day of sampling activity. While a trip blank may be prepared for analysis of all analytes of interest, normal practice is to prepare trip blanks only for volatile organic analytes (e.g., BTEX, etc).

A "field blank" sample consists of organic free, distilled water that is sealed in clean sample containers by the PARTNERS laboratory coordinator or the contract laboratory and is transported with the empty sample bottles to the sampling site. The cap(s) is removed from the sample container and the water in the sample container is exposed to the atmosphere for a few seconds. The field blank is then sealed and returned to the laboratory with the collected samples for analysis. The field blank is analyzed to determine if the field samples may have been affected by atmospheric contaminants. Normal practice requires preparation of one field blank for each day of sampling. As an alternative, one field blank may be prepared to represent the entire sampling period, if major changes in atmospheric conditions do not occur.

An "equipment blank" sample consists of organic free, distilled water that is sealed in clean sample containers by the PARTNERS laboratory coordinator or the contract laboratory and is transported to the sampling site. Following thorough decontamination of the sampling equipment (e.g., bailer, split spoon, trowel, etc) using procedures in FSOP No. 005, the organic free, distilled water is poured

over or through the sampling device and is collected in unused, clean sample containers. The sample container is preserved as needed, sealed and analyzed to determine if the field samples may have been subjected to contamination by improperly decontaminated. Normal practice requires that one equipment blank be prepared for each day of sampling. One equipment blank also should be prepared for each type of sampling device used during the day's efforts. An equipment blank can be prepared for all analytes of interest.

A "<u>replicate"</u> sample is one or more separate samples collect from the same location and sample volume using the same device. Replicate samples should be prepared from the same volume of sample without placement in an intermediate common container. For example, when filling VOA bottles, water from the same bailer-full would be used to prepare each replicate sample. Normal practice requires preparation of one replicate sample (also referred to as a duplicate sample) for every ten (10) field samples. At a minimum, one replicate sample should be prepared for each day of sampling. Replicate samples should be analyzed for all analytes of interest.

"Matrix spike and matrix-spike duplicate" (MS/MSD) samples consist of two replicate samples that are prepared for the same sampling location and submitted to the laboratory to be used for laboratory QA/QC purposes. Normal practice requires preparation of MS/MSD samples at a frequency of one per every 20 field samples. Frequently no MS/MSD samples are specifically prepared as part of an investigation, because the laboratory can use a portion of one or more of the field samples provided. Is the laboratory is requested to run MS/MSD samples (either specially prepared or prepared from a field sample) there will be an analytical charge for two additional samples. MS/MSD samples should be analyzed for all analytes of interest.

- 2. After determining the type, number, and frequency of QA/QC samples to be collected or prepared, obtain the necessary organic free, distilled water and clean sample containers from the contract laboratory. Distilled water should not be trip blank, field blank, or equipment blank.
- 3. Prepare the required QA/QC samples. If possible, use a sample identification system for QA/QC samples (except the MS/MSD samples) that does not allow the analytical laboratory know that the sample is intended for QA/QC purposes. Complete Chain-of-Custody forms with necessary information for QA/QC samples.

FSOP 006

**FSOP No.: 007** Rev. No.: 0

Title: Headspace Screening for Volatile Organic Compounds

Approved by: Dan B. Brown, CPG

Date: 10/14/02

- 1. Calibrate field instrument to a known standard and record calibration results in field log.
- 2. Conduct in-field adjustment of the instrument, and establish ambient air equal 0 meter units.
- 3. Select a representative aliquot of sample and place in the headspace-screening container. The headspace screening container may be either a clean wide-mouth glass jar (125-ml preferred) or a ziplock (or equivalent) plastic bag (sandwich size preferred).

**SUMMARY** 

- 4. **Seal the container.** If a glass jar is used, place a single layer of aluminum foil over the mouth of the jar and then put on the jar lid. If a plastic bag is used engage the zip-lock mechanism.
- 5. **Warm the sample to 70°F, if possible**. If the sample cannot be warmed to 70°F, allow the container to set undisturbed for at least 15 minutes.
- 6. **Insert the probe** of the instrument **into the headspace container** and extract vapors from the container for analysis.

Record the highest meter reading on Drilling Log.

#### PROCEDURES FOR HEADSPACE SCREENING

1. Calibrate the flame ionization detector [e.g., Organic Vapor Analyzer (OVA), TVA 1000, etc.] or photoionization detector, [e.g., TVA 1000, HNu, Photovac, TIP, etc.] to a gas standard of known composition and concentration, as required by the instrument's operating manual. The OVA is normally calibrated to methane. Photoionization detectors are calibrated to gases other than methane. The instruments provide measurements as equivalent parts per million (ppm) to the calibration gas. Calibration should be completed daily.

Because the OVA detects methane it may be necessary to use Draeger tubes or equivalents to verify the measured results. A carbon filter can be placed on the instrument probe to scrub methane.

Photoionization detectors are subject to interference by soil water vapor and dust. Frequent cleaning of the lamp is needed.

- 2. Upon arriving in the field, adjust the instrument so that ambient air represents 0 meter units. If there is a change in wind direction or weather (e.g., rain, snow, temperature drop, etc.) the instrument should be readjustment for ambient air conditions. If readjustment is necessary, not changes on in log book or on Field Activity Log.
- 3. Select a representative aliquot (i.e., portion) of soil or sediment sample from the sampling device and place it into a headspace container. The headspace container may be either a clean wide-mouth glass jar (125-ml preferred) or a zip-lock (or equivalent) plastic bag (sandwich size

preferred). If the sample is collected using the Geoprobe® or a standard split-spoon sampler, place approximately one-inch of material in either type of container. If a bucket auger, scoop, or sampling ladle is used, place about one-inch of material in the glass container or fill the plastic bag about 10 percent full. Whichever headspace container is used, and regardless of sample collection method, attempt to place the same quantity of material in the headspace container for all samples to be analyzed during the investigation.

If a plastic bag is used as a headspace container, measure the concentration of volatile organic vapors in the bag before putting a sample into the bag. Adjust the instrument calibration, if any volatile organic vapors are measured. The ambient bag air should be set to 0 meter units.

- 4. After placing the sample aliquot in the headspace container, immediately seal the container. If a glass jar is used, place a single layer of aluminum foil over the mouth of the jar and then put on the jar lid. The piece of foil should be large enough to extend below the lip of the jar when sealed. If a plastic bag is used, engage the zip-lock mechanism. Do not squeeze air from the plastic bag before sealing.
- 5. To allow the vapors of volatile organic compounds to be released from the into the air space in the headspace container, warm the headspace sample to at least 70°F, allow the container to set undisturbed for at least 15 minutes. To promote volatilization, the sample material in a plastic bag can be gently broken apart in the bag.
- 6. Insert the probe of the instrument into the headspace container and extract vapors in the container. If a glass jar is used, carefully remove the jar is used, carefully remove the jaw lid and insert the probe through the aluminum foil. If a plastic bag is used, insert the probe through a small opening in the zip-lock top. To avoid blocking the probe, it may be necessary to poke a small hole in the foil before inserting the probe.
  - Extreme care should be taken when screening the samples to prevent loss of vapors from the sample container. This can be achieved by keeping the container tightly sealed at all times, before and after analysis, and by minimizing the size of the hole into which the probe is placed.
- 7. After inserting the instrument probe (the instrument pump will be operating) watch the instrument meter and **record the highest observed reading on the Drilling Log.** Usually the highest reading will occur immediately following insertion of the instrument probe into the headspace container.
- 8. Immediately after the headspace reading is taken retract the probe from the headspace container to prevent unnecessary volatilization. If a glass jar is used, the foil is left in place, and the jar is tightly sealed. If a plastic bag is used, ensure that the seal of the bag is complete. Following screening the headspace container may be placed in a cooler containing blue ice for analysis, if the sample is to be analyzed for non-volatile analytes (e.g., metals, extracts, etc.).

**FSOP 007** 

**FSOP No.: 008**Rev. No.:0

Title: Fluid Level Measurement in Groundwater Monitoring Wells

Approved by: Dan B. Brown, CPG

Date: 10/14/02

#### SUMMARY

- 1. Obtain well number(s), well diameter, total depth of well(s), and top of casing elevation and other requirements from the Project Manager.
- 2. Assemble essential measurement equipment.
- 3. Once onsite, **note condition of each well** and enter information on appropriate log or form.
- 4. **Measure water level** to nearest 0.01 feet with a water level indicator; measure non-aqueous liquid, if present, with an interface probe.

#### PROCEDURES FOR MEASURING FLUID LEVELS IN MONITORING WELLS

- 1. Prior to fluid level measurement, **obtain the following information:** the well numbers(s), well diameter, total depth of the well(s), the top of casing elevation for the well(s), and other pertinent information. This information will be supplied by the Project Manager (PM) as part of the Sampling and Analysis Plan and should be entered onto the appropriate log or form. If this information is not available, measure the well casing diameter and total well depth prior to fluid level measurements.
- 2. Prior to leaving the office, **assemble all of the essential fluid level measurement equipment.** If non-aqueous liquids are expected, select an interface probe. If non-aqueous liquids are not expected, select an m-scope.
- 3. Once at the site, **inspect each well.** Note abnormalities including, but not limited to: is the well locked, is the well top cracked or broken if the well has casing above ground, is the casing still upright or is it tilted due to a contact with vehicles or machinery, is the casing intact or broken? Note the well condition on the appropriate log or form. Notify the PM of any suspicious or unusual conditions.
- 4. Measure water level and non-aqueous liquid thickness to nearest 0.01 feet. Measure water level with a water level indicator, measure non-aqueous liquid thickness with an interface probe. Record result on appropriate log or form. Decontaminate the water level meter and interface prove with distilled water (and a non-phosphate detergent, if necessary) between wells and anytime the equipment is used in wells containing non-aqueous liquids.

Title: Drilling Equipment Decontamination

Approved by: Dan B. Brown, CPG

Date: 10/14/02

#### **SUMMARY**

- 1. Prepare decontamination supplies.
- 2. Transport equipment to designed decontamination area.
- 3. Put on gloves and other protective clothing.
- 4. Remove dirt and other gross contamination.
- 5. Rinse the drilling equipment with high-pressure steam cleaner using only potable water.
- 6. Let air dry.
- 7. Collect all waste for proper disposal.

#### PROCEDURES FOR DECONTAMINATION DRILLING EQUIPMENT

- 1. **Prepare all necessary decontamination supplies**, including brushes, high-pressure steam cleaner, decontamination solutions, etc.
- 2. Transport drilling equipment, including augers, drill rods, backhoes, hand tools, and other downhole equipment to the designated decontamination area. The decontamination area will be designed to contain decontamination wastes and waste waters. The area can be lined excavated pit or bermed concrete, asphalt, or wooden pad equipped with a floor drain that is connected to holding tank or to drums. A shallow, above-surface tank may be used or a pumping system with discharge to a waste tank or drums may be installed.
- 3. All drilling equipment will be decontaminated before use, between borings, and after use. It may also be necessary to decontaminate the back of the drilling rig before and after use.
- 4. **Put on gloves to protect hands** during decontamination. Protective clothing may also be necessary in some instances (refer to Health and Safety plan for requirements).
- 5. Remove all dirt and gross contamination from the drilling equipment using a clean, stiff bristle brush.
- 6. Following removal of all dirt, wash all drilling equipment using the high-pressure steam cleaner. The source of water for the steam cleaner must be potable water.
- 7. Collect all waste materials generated during decontamination for proper disposal.

**FSOP No.: 010**Rev. No.: 0

Title: Design and Installation of Single Cased Monitoring Wells

(To be used in conjunction with ASTM D 5092 approved drilling procedures and applicable standards)

Approved by: Dan B. Brown, CPG

Date: 10/14/02

#### SUMMARY

- 1. Measure depth of borehole.
- 2. Select depth of the well and determine the screened interval.
- Determine materials to be used to construct the well.
- 4. Assemble well screen and riser and install in borehole. Measure depth to bottom of well.
- 5. **Install filter pack.** Measure depth to top of filter pack.
- 6. Install well seal above filter pack. Measure depth to top of well seal.
- 7. Install grout in annular space.
- 8. Install well protector and complete surface installation.
- 9. Label well protector and mark measuring point.
- 10. Install lock on monitoring well cap.

# PROCEDURES FOR DESIGN AND INSTALLATION OF SINGLE CASED MONITORING WELLS

- 1. The depth of the borehole shall be measured at the termination of drilling using a properly decontaminated (FSOP No. 006) measuring tape. Record the depth on the Drilling Log and Well Construction Form.
- 2. Select the depth of the well and determine the screened interval to achieve project objectives. Well depths and screened intervals may be stipulated by applicable regulatory requirements, (e.g. set of five feet below the water table with ten feet of screen, set 7.5 feet below the water table with 15 feet of screen, etc.)
- 3. Determine material to be used to construct the well. Well materials may also be stipulated by applicable regulatory requirements.

One common design used by Partners consist of ten feet of two-inch diameter Schedule 40 PVC, 0.01 or 0.02 inch slotted screen and an appropriate length of two-inch diameter Schedule 40 PVC riser with flush threaded joints. Bottom flush treaded caps and pressure tight locking caps are used.

4. **Assemble well screen and riser and install in borehole.** Wear clean latex or cotton gloves to handle the well screen, bottom plug and riser to avoid contaminating the well materials with grease, oil or other contaminants prior to installation. Flush-threaded joints should be tightened by hand taking care not to damage the threads. The well screen and riser may be assembled first and then lowered into the borehole, however, for the most wells it is easier to insert only the well screen with bottom plug

into the borehole. The screen is lowered and held in the borehole (either by gloved hand or by properly decontaminated pipe wrench, etc.) as the next section of riser is added.

To lower the well screen and riser assembly, ballast may be required to counteract the tendency of the assembly to float in the borehole. Ballasting may be accomplished by filling the riser with water of a known chemistry or water that was previously removed from the borehole. (ASTM D 5092). Alternatively, the riser may slowly be pushed into fluid in the borehole. Care must be taken to make sure the assembly is installed straight. Centralizers may be used to ensure the well is installed correctly. The riser should extend above grade and be caped temporarily to deter the entrance of foreign materials during completion of the well. After the well assembly is installed in the borehole, measure the depth to the well.

5. Install the filter pack between the screen and borehole wall. A properly decontaminated tamp or weighted line/tape measure should be used to ensure the absence of voids in the filter pack. The filter pack should be composed of clean silica sand, with grain sizes larger than the well screen opening. The filter pack should extend above the well screen a distance of approximately 20% of the length of the well screen but not less than two feet.

During installation of the filter pack, **slowly remove any augers or drive casing**, measuring the settling of the filter pack as the augers are removed. The augers should be retracted so that the bottom of the augers is between tow and five feet above the top of the filter pack. Add filter pack to a depth equal to the bottom of the augers, then retract the augers another two to five feet, until the filter pack is approximately two feet above the well screen. Once the augers have been completely removed, **measure the depth to the top of the filter pack**. Add more filter pack material, if necessary. **Measure the depth to the top of the filter pack and record on the Well Construction Form.** 

- 6. Install a well seal above the filter pack. The seal may be bentonite pellets, hole plug, or a bentonite slurry. If bentonite slurry is selected as the well seal, a tremie pipe must be used to install the seal. If bentonite pellets or hole plug is used, hydrate the seal with one to two quarts of potable water after installation. A tamper or weighted line may be necessary to pack one to two feet. A centralizer should not be placed in the well seal. After the well seal is installed, measure the depth to the top of the well seal and record on the Well Construction Form.
- 7. Fill the remaining annular space with grout. The grout may be injected under pressure, or under gravity feed with a tremie pipe. If less than five feet of annular space needs to be grouted, the grout may be mixed and poured into the borehole. Neat Portland cement or a neat Portland cement and bentonite (about 2% by weight) grout should be used. The grout should have a weight of 12 to 14 pounds per gallon. The grout should be installed to within approximately one foot of the surface. The depth of the top of the grout should be measured and recorded on the Well Construction Form.
- 8. Unless otherwise specified in the project work plan, a **two foot by two foot square area should be a cut into the material around the borehole.** This material in this area should be removed to a depth of one foot. The **flush mount or stand-up well protector will ten be installed.** If a stand-up well protector is used, install a small diameter weep hole in the protective casing about three inches above grade. A fast setting concrete mix is used to fill the remaining annular space and excavated area around the well. The surface of the concrete pad will be installed to **slope down away from the well protector.** Record information on the Well Construction Form regarding protector type and depth of concrete pad.
- 9. Label the inside lid of the well protector using an indelible marker to identify the well. Mark the top of the well casing with a permanent marking to establish the measuring point.
- 10. Install a locking well cap on the well and lock the cap with a PARTNERS keyed-alike short or long shank lock. Make sure the well protector is closed properly and secure.

FSOP 010 Page 2 of 2

**FSOP No.: 012** Rev. No.: 01

Title: Geoprobe® Sampling of Soils

Approved by: Dan B. Brown, CPG

Date: 03/02/10

#### **SUMMARY**

- 1. Label appropriate pre-cleaned sample containers.
- 2. Decontaminate sampling equipment.
- 3. **Drill** through or core surface material (e.g. asphalt or concrete).
- 4. Attach sample tube with new acetate liner.
- 5. Drive sample tube to top of sample interval.
- 6. Insert the extension rods and engage the retaining pin.
- 7. Release drive point.
- 8. **Drive sample tube** to bottom of sample interval.
- 9. Pull drive rods.
- 10. Remove the acetate liner from the sample tube.
- 11. Split liner with decontaminated knife and place sample into sample containers.

# SEE PROCEDURES BELOW (SECTION II) FOR SPECIAL CONSIDERATIONS FOR VOC SAMPLES

- 12. Record sample recovery.
- 13. Describe soil sample as specified in FSOP No. 004.
- 14. Place an aliquot of sample into a headspace container and **conduct sample headspace vapor screening** (FSOP No. 007).
- 15. Place sample containers into cooler with ice or blue ice packs.
- 16. **Decontaminate the sampling tube** as specified in FSOP No. 005.
- 17. Complete the Chain-of-Custody Form.

#### PROCEDURES FOR USE OF THE GEOPROBE®

1. Place PARTNERS sample label(s) on appropriate pre-cleaned sample jar(s). Put project number and site location in <u>Site Name</u> section. Fill in <u>Analysis</u> required (e.g., BTEX by 8020 or TCLP lead, etc.), <u>Date</u> and <u>Preservative</u> (e.g., refrigeration or nitric acid) sections. In the <u>Sample Description</u> section, include information regarding the location where the sample was collected at the site (e.g., SB-4, 10-12 feet for Soil boring 4 at 10 to 12 foot depth interval).

- 2. **Decontaminate** the sampling tubes, drill rods, and other downhole equipment using the procedures specified in FSOP No. 005.
- 3. Using the hammer bit, **break through any hard surface material** that may be present (e.g. asphalt). If necessary, core concrete.
- 4. Place a new acetate liner in the sample tube and attach the sample tube with the drive point locked in the down position. PARTNERS normally uses either a two (2)-foot long by one (1)-inch diameter or 4-foot long by two (2)-inch diameter sampling tube.
- 5. **Drive** the **sample tube to** the top of the **sample interval.**
- 6. **Insert the extension rods** into the drive rods and engage the retaining pin. (The retaining pin and sample tube center rod are not used with the 4-foot long sampler.)
- 7. **Remove the retaining pin** to release the retractable drive point in the sampler.
- 8. **Drive the sample tube** to the bottom of the sample interval.
- 9. Pull the drive rods and sample tube to retrieve the sample.
- 10. **Remove the liner** from the sampling tube, place on a clean surface, and split open with a decontaminated knife.
- 11. Using glove hands, place one portion of the sample into properly labeled sample containers.

SPECIAL CONSIDERATIONS FOR COLLECTION OF SAMPLES FOR VOLATILE ORGANIC COMPOUNDS (VOCs): Samples collected for volatile organic compound analyses must be collected prior to any sample homogenization. Regardless of the method used for collection (single use Encore® sampling devices and other similar syringes/collection devices for preservation Method 5035), the aliquot for volatile organic compound analyses must be collected directly from the sampling device, to the extent practical. The aliquot should be collected directly from the device, (Geoprobe acetate liner, split-spoon sampler, hand auger bucket etc.), if possible. If a device such as a dredge is used, the aliquot should be collected after the sample is placed in the mixing container prior to mixing. In some cases, the sediment may be soft and not lend itself to collection by plunging Encore® or syringe samplers into the sample matrix. In these cases, it is appropriate to open the sample device, i.e., the Encore® corer or syringe, prior to sample collection, and to carefully place the sediment in the device, filling it fully with the required volume of sample. Further explanation of Encore® sampling methods is described in FSOP No. 029. After collection of the VOC samples, the remainder of the soils should be thoroughly mixed prior to collecting the remainder of the soil samples.

- 12. Record the number of inches of sample recovered on the Drilling Log.
- 13. **Describe the sample** as specified in FSOP No. 004, which generally conforms to ASTM procedures for soil description.
- 14. If required, place one (1) portion of the sample in a headspace container using a gloved hand or a decontaminated metal scoop. Seal the container and conduct sample vapor headspace screening as specified in FSOP No. 007.
- 15. Place properly labeled sample containers in a cooler with ice or blue ice packs.
- 16. **Decontaminate the sampling tube** as specified in FSOP No. 005.
- 17. **Complete the Chain-of-Custody Form,** including all dates and times of samples collected. Include trip blanks and duplicate samples on this form by using a unique sample location number.

**FSOP No.: 013** Rev. No.: 0

Title: Surveying

Approved by: Dan B. Brown, CPG

Date: 10/14/02

#### SUMMARY

- 1. Obtain necessary site location information.
- 2. Prepare necessary surveying equipment.
- 3. Prepare site base map.
- 4. Set up tripod.
- 5. Place instrument on tripod.
- 6. Level the instrument.
- 7. Check the compensator.
- 8. Determine instrument height.
- 9. Establish horizontal control.
- 10. Survey elevation, distance, and direction of wells, borings, and other points.
- 11. Check multiple points, if second setup is required.
- 12. If possible, use a closed traverse for surveys requiring multiple setups.

#### PROCEDURES FOR SURVEYING

- 1. Prior to traveling on the site, **obtain any existing site plans** and determine what additional information will need to be gathered in the field. Information that will typically be required includes the locations and elevations of borings and well, and the locations of buildings, underground storage tanks, property boundaries and underground utilities.
- 2. **Prepare the surveying equipment.** Items that might be needed are the automatic level (or transit), tripod, stadia rod, measuring tape, measuring wheel, data sheets, calculator, and compass.
- 3. Upon arrival at the site, the first step will be to prepare a base map with general site features, if one does not already exist. Using the measuring wheel or tape, determine the dimensions of the building(s). Locate the building on the base map by measuring distances to major features such as property boundaries, fences, and roads. Measurements should be made from corners of the building and parallel to walls of the building. Care should be taken to include all necessary dimensions needed to construct a map to scale in the office.

- 4. Set up the tripod by extending the legs and firmly positioning them on the ground. If possible, the tripod should be set up on grass or bare ground so that the points on the ends of the legs can be pushed into the ground 1 to 2 inches. Ideally, the tripod should be positioned so that all wells and borings can be surveyed with a single set up. On large sites, it is also good to place the tripod in a central location between the wells and borings, since accuracy decreases as the distance from an object being surveyed increases.
- 5. Place the instrument on the tripod and secure it in place with the fixing screw.
- 6. Adjust the legs of the tripod until the instrument is roughly horizontal, and then use the foot screws on the instrument to **center the bubble on the level indicator.**
- 7. **Check the compensator in the instrument** by touching the lever on the right side while viewing an object. The image should move freely away from the horizontal cross hair and return gently to the original position. A short, jerky movement indicates that the instrument is not level or is damaged. Do not complete the survey if the instrument is damaged.
- 8. Establish the height of the instrument by sighting on a benchmark. Accurate measurements depend on the stadia rod being vertical when it is read. Use the bubble level to ensure that the rod is vertical. The rod should be parallel to the vertical cross hair when viewing. If the bubble level is not used to ensure the staff is vertical when read, the assistant should slowly rock the rod toward and away from the surveyor as it is being viewed. The smallest value observed is the true vertical height. The measured height should be added to the elevation of the benchmark to determine the instrument height. Measurements should be made to the nearest 1/8-inch or 0.01 foot, depending on the staff being used.
- 9. To establish horizontal control, the level needs to be located relative to site features. At least two known points are required and three are best. Two corners of a building are often good reference points. The horizontal distance of the instrument to each point should be determined. The instrument should be sighted in on one of the points and the azimuth ring should be set to zero. If true bearings are required, a Brunton compass, or similar, should be used to determine the bearing of one of the points from the instrument. The azimuth should then be set to this bearing.
- 10. Each well, boring, and other point can now be surveyed. Elevation of each point is determined by subtracting the stadia rod reading at the center cross hair from the instrument height. The horizontal distance to each point is determined using the upper and lower cross hairs. The rod reading at the upper and lower cross hairs should be recorded.
- 11. The difference between the upper reading and the lower reading are multiplied by 100 to calculate the horizontal distance. Record the azimuth reading. Keep in mind that degrees increase from right to left on the azimuth ring, unlike most measuring devices which increase from left to right.
- 12. **If a second setup is required** to allow surveying all the locations, at least **one** additional **point from the previous setup should be surveyed** in addition to the points used for the new benchmark and horizontal control.
- 13. If multiple setups are required, it is best to progress in a circular pattern (closed traverse) so that a point from the first setup is also surveyed as part of the last setup. This allows for error to be detected.

FSOP 013 Page 2 of 2

**FSOP No.: 014** 

Rev. No.: 01

Title: Subsurface Sampling – Split Spoon Sampler

Approved by: Dan B. Brown, CPG

Date: 03/02/10

#### SUMMARY

This Field Standard Operating Procedure describes collection of disturbed samples of unconsolidated materials using a split-spoon sampler. Because samples collected by this method may be submitted for chemical analysis, the FSOP includes procedures for decontamination of the sampling equipment and methods to properly handle the samples.

Split-spoon sampling is frequently conducted in conjunction with hollow-stem auger driller. However, other drilling methods (e.g., rotary, cable tool, etc.) may also be used.

- 1. Decontaminate the split-spoon sampler.
- 2. Attach the split-spoon sampler to the drill rod.
- 3. After the boring has been advanced to the desired sampling depth, **lower the split-spoon sampler** to the bottom of the borehole.
- 4. Attach the drill rod assembly to the drive hammer.
- 5. Drive the split-spoon sampler.
- 6. Count the number of blows to drive the sampler each 6-inch increment.
- 7. Retrieve the sampler.

SEE PROCEDURES BELOW (SECTION 10) FOR SPECIAL CONSIDERATIONS FOR VOC SAMPLES

- 8. Remove the sample from the split-spoon and describe the sample.
- 9. Decontaminate the sampling tube.

#### PROCEDURES FOR SUBSURFACE SAMPLING - SPLIT SPOON SAMPLER

- 1. Place sample label(s) on appropriate pre-cleaned sample jar(s). Put project number and site location in <u>Site Name</u> section. Fill in <u>Analysis</u> required (e.g., BTEX by 8020, TCLP lead, etc.), <u>Date</u> and <u>Preservative</u> (e.g., refrigeration or nitric acid) sections. In the <u>Sample Description</u> section include information regarding the location where the sample was collected at the site (e.g. SB-4, 10-12 feet for Soil boring 4 at 10 to 12 foot depth interval).
- 2. **Decontaminate** the split-spoon sampler using the procedures specified in FSOP No. 005.
- 3. Attach the split-spoon sampler to the drill rod. A standard split-spoon collects a 24-inch long by one and one-half inch(1.5 ln)-diameter sample. Other lengths and diameter are available for

specialty uses. The sampler includes a drive shoe, the sampling tube which is split into two (2) pieces length-wise, and an adapter to attach the spoon to the drill rods.

If loose material is anticipated (e.g., wet sand, etc.), place a basket screen between the drive shoe and the sampling tube to retain the sample during recovery.

- 4. After the boring has been advanced to the desired sampling depth, lower the split-spoon sampler to the bottom of the borehole.
- 5. Attach the drill rod assembly to the drive hammer. The drive hammer may be actuated using a rope-cathead, trip, semi-automatic or automatic hammer drop system.
- 6. **Drive the split-spoon sampler** to the bottom of the sample interval using 140-pound hammer. Regardless of the hammer drop system used, the hammer is lifted 30 inches and drops unimpeded.
- 7. Count the number of blows to drive the sampler each 6-inch increment. The split-spoon sampler shall be driven 24 inches. However, if a total of 50 blows per 6-inch increment or a total of 100 blows have been applied, terminate sampling. Record the blow count on the Drill Log.
- 8. Pull the drill rods and split-spoon sampling tube and retrieve the sample.
- 9. **Describe the sample** as specified in FSOP No. 004, which generally conforms to ASTM procedures for soil description. The description shall also include the length of sample recovered either as total inches or as a percentage of the length of the sampler.
- 10. Place the sample in a new clean, glass wide-mouth sample jar. If the sample is to submitted for chemical analysis, place properly labeled sample containers in a cooler with ice and chill to 32°F (4°C). If the sample is not to be submitted for chemical analysis, dispose of properly.

SPECIAL CONSIDERATIONS FOR COLLECTION OF SAMPLES FOR VOLATILE ORGANIC COMPOUNDS (VOCs): Samples collected for volatile organic compound analyses must be collected prior to any sample homogenization. Regardless of the method used for collection (single use Encore® sampling devices and other similar syringes/collection devices for preservation Method 5035), the aliquot for volatile organic compound analyses must be collected directly from the sampling device, to the extent practical. The aliquot should be collected directly from the device, (Geoprobe acetate liner, split-spoon sampler, hand auger bucket etc.), if possible. If a device such as a dredge is used, the aliquot should be collected after the sample is placed in the mixing container prior to mixing. In some cases, the sediment may be soft and not lend itself to collection by plunging Encore® or syringe samplers into the sample matrix. In these cases, it is appropriate to open the sample device, i.e., the Encore® corer or syringe, prior to sample collection, and to carefully place the sediment in the device, filling it fully with the required volume of sample. Further explanation of Encore® sampling methods is described in FSOP No. 029. After collection of the VOC samples, the remainder of the soils should be thoroughly mixed prior to collecting the remainder of the soil samples.

If required, place one (1) portion of the sample in a headspace container using a gloved hand or a decontaminated metal scoop. Seal the container and conduct sample vapor headspace screening as specified in FSOP No. 007.

- 11. Decontaminate the sampling tube as specified in FSOP No. 005.
- 12. **Complete the Chain-of-Custody Form,** including all dates and times of samples collected. Include trip blanks and duplicate samples on this form by using a unique sample location number.

Title: Chain-of-Custody Control Procedures

Approved by: Dan B. Brown, CPG

Date: 03/03/03

#### SUMMARY

- 1. **Initiate chain-of-custody documentation** at the time of sample collection.
- 2. Samples should be identified using labels containing the following pertinent information.
- 3. The sample should be **retained in view or under limited-access sealed storage** until custody is relinquished and formal documentation of transfer is completed.
- 4. The **sampler is responsible for proper recovery, preservation and storage** of the sample until delivered to the analytical laboratory or common carrier.
- 5. The sampler shall complete a Chain-of-Custody record.
- 6. Upon delivery of the samples with accompanying Chain-of-Custody Log, the log shall be signed and dated (with time) by the relinquishing sampler.

#### PROCEDURES FOR CHAIN-OF-CUSTODY CONTROL

- 1. **Initiate chain-of-custody documentation** at the time of sample collection.
- 2. **Samples should be identified using labels** containing the following pertinent information. Use insoluble ink on the labels.
  - Name of facility
  - Facility address or location
  - Sample date
  - Time of sample collection
  - Media (e.g., groundwater, soil, etc.)
  - Sample type (e.g., grab, composite, etc.)
  - Sample location or unique sample identification number
  - Sampling person
  - Amount and type of preservative, if any.

If multiple sample containers are used for a single environmental sample, the information listed above should be placed on all containers. Additionally, each contain should include identification of the analytes to be determined from that container.

3. Once the sample is collected, it should be **retained** by the sampler **in view or under limited-access sealed storage** until custody is relinquished and formal documentation of transfer is completed.

- 4. The **sampler** (or field custodian) **is responsible for proper recovery, preservation and storage** of the sample until delivered to the analytical laboratory or common carrier.
- 5. The **sampler** (or field custodian) **shall complete a Chain-of-Custody record** in duplicate. The Chain-of-Custody shall include the information listed in Item 2 above. The Partners Chain-of-Custody Log may be used or a Chain-of-Custody Log provided by the laboratory may be used.
- 6. Upon delivery of the samples with accompanying **Chain-of-Custody Log**, the log **shall be signed and dated (with time) by the relinquishing sampler** (or custodian). The Log is then signed and dated by the laboratory and a copy is provided to the custodian.

If the samples are shipped by common carrier (e.g., Fed Ex, UPS, etc.), the signed and dated Chain-of-Custody Log is sealed in a water-proof bag and placed inside the shipping container with the samples. The shipping container shall be doubly sealed with packing tape and Chain-of-Custody seals may be placed across the lid of the shipping container.

**FSOP No.: 024** Rev. No.: 0

Title: Management of Investigation Derived Wastes

Approved by: Dan B. Brown, CPG

Date: 12/12/03

#### SUMMARY

This Field Standard Operating Procedure describes procedures to be followed to properly manage and dispose of wastes generated during a field sampling effort. These wastes may include soil, water, PPE, trash, etc. Some of these materials may potentially be hazardous wastes and proper management is critical for compliance with state and federal hazardous waste regulations.

- 1. Management of investigation derived wastes (IDW) involves proper storage of the wastes to avoid releases to the environment, proper characterization of the waste, and appropriate disposal.
- 2. **Assemble the appropriate number and type of containers** to contain IDW generated during the investigation.
- 3. Separate containers should be used for each different type of IDW generated.
- 4. **Prepare a controlled area of temporary storage of IDW**. The temporary storage area should be large enough to handle all the waste material to be generated, it should have limited access (temporary fencing may have to be installed), and it should be contained, where feasible, to prevent the release of wastes to the environment.
- 5. Fill the storage containers at the site of investigation and transport to the temporary storage area. The containers should be properly sealed to prevent spillage during transport.
- 6. **Clearly label the containers** with information about the type of IDW (e.g., soil, purge water, trash, etc.) the location where generated and date of generation.
- 7. Collect a representative sample of each different type of IDW for waste characterization analysis.
  - If waste characterization sampling defines the material to be a characteristically hazardous waste, apply a "Hazardous Waste" label to the container.
- 8. Using the waste characterization analytical results, determine the proper method for off-site disposal of the IDW.

FSOP No. 024 Page 1 of 2

# PROCEDURES FOR MANAGEMENT OF INVESTIGATION DERIVED WASTES

- 1. Management of investigation derived wastes (IDW) involves proper storage of the wastes to avoid releases to the environment, proper characterization of the waste, and appropriate disposal. Before an investigation is initiated, identify the type(s), amount and character (e.g., hazardous, non-hazardous, solid, liquid, etc.) of the waste to be generated.
- 2. **Assemble the appropriate number and type of containers** to contain IDW generated during the investigation. These containers may include steel or plastic 55-gallon drums, tanks or roll-off boxes or totes but may also involve stockpiling of solids on the ground.
- 3. Separate containers should be used for each different type of IDW generated. Thus, solids should not be mixed with liquids and potentially hazardous wastes should not be mixed in with non-hazardous wastes.
- 4. Prepare a controlled area of temporary storage of IDW. The temporary storage area should be large enough to handle all the waste material to be generated, it should have limited access (temporary fencing may have to be installed), and it should be contained, where feasible, to prevent the release of wastes to the environment.

The IDW should be placed on an impermeable surface. Place Visqueen or equivalent plastic on the ground over the temporary storage area as a liner. There should be no seams or multiple criss-cross layers may be used to minimize the likelihood of breaches in the liner. The plastic should be extended over a berm of hay bails or soil used to form a dike around the temporary storage area. (Self-contained storage areas are commercially available to handle a few drums of IDW.)

If IDW is stockpiled it should be covered with plastic and a berm should be installed to prevent uncontrolled runoff and erosion.

If a paved parking area is used, the pavement should be inspected to assure that there are no cracks through which liquids or solids could be released to soil.

- 5. Fill the storage containers at the site of investigation and transport to the temporary storage area. The containers should be properly sealed to prevent spillage during transport.
- 6. Clearly label the containers with information about the type of IDW (e.g., soil, purge water, trash, etc.) the location where generated and date of generation. Do not use a "Hazardous Waste" label unless it is clearly known that a listed RCRA hazardous waste is present in the IDW.
- 7. Collect a representative sample of each different type of IDW for waste characterization analysis. If an IDW is not known to be a hazardous waste, analyze the sample for corrosivity, ignitability, reactivity, and toxicity characteristics (TCLP). The TCLP procedure can be conducted for metals, volatile organic compounds or semi-volatile organic compounds. Determine the analytical suite based on site-specific information.

The results of analysis of environmental samples (e.g., soil, groundwater, etc.) can be used to characterize IDW, but care should be taken to assure that the sample is representative of the mass of IDW generated.

- 8. If waste characterization sampling defines the material to be a characteristically hazardous waste, apply a "Hazardous Waste" label to the container and ensure that procedures described in FSOP 25 are followed.
- 9. Using the waste characterization analytical results, **determine the proper method for off-site disposal** of the IDW. Non-hazardous wastes may be stored on site for an unlimited length of time, but hazardous wastes can only be stored for 90 days from the date of generation.

Partners will not sign manifests for any IDW for the waste transporter or disposal company.

FSOP No. 024 Page 2 of 2

FSOP No.: 027 Rev. No.: 0

Title: Shipping Environmental Samples

Approved by: Dan B. Brown, CPG Date: 06/06/06

#### SUMMARY

- 1. Line a cooler with a plastic bag.
- 2. After placing bubblewrap or other suitable packing materials at the bottom of the cooler, place sealed sample containers in the cooler.
- 3. Place sealed bags of ice and/or additional packing materials in between and/or on top of the sample containers and **seal the bag lining the cooler.**
- 4. Tape the Chain-of-Custody Record to the inside of the cooler lid and then securely tape the cooler shut.
- 5. Affix the shipping label (airbill) to the top of the cooler and arrange for cooler pickup/drop-off.

#### PROCEDURES FOR SHIPPING ENVIRONMENTAL SAMPLES

- 1. Select a sturdy cooler in good condition. Secure and tape the drain plug (inside and outside) with tape. Line the inside of the cooler with a large, heavy-duty plastic bag.
- 2. **Be sure the lids on all bottles are tight** and will not leak while in transit. Also be sure that sample labels are firmly fixed to the sample container(s).
- 3. Wrap all glass sample containers in bubblewrap or other suitable packing material and place sample containers into an appropriately sized, sealable plastic bag.
- 4. Place bubble wrap or other cushioning material in the bottom of the cooler and then place the sample containers inside the cooler, allowing space between individual containers for the addition of ice and supplemental cushioning material, if necessary.
- 5. Place sealed bags of ice on top of and/or between sample containers. If required by the laboratory, include a temperature blank at the bottom of the cooler. Fill all remaining space between the sample containers with packing materials. Fold and securely fasten the top of the large, heavy-duty plastic bag with tape.
- 6. Place the Chain-of-Custody Record into a sealable plastic bag and tape to the inside of the cooler lid. Close the cooler and securely tape the cooler closed. Wrap tape around the cooler three (3) to (4) times, going with the seam of the cooler lid once and twice across the seam, at either end of the cooler. Custody seals should be affixed to the top and sides of the cooler within the securing tape so that the cooler cannot be opened without breaking the custody seal.
- 7. Each cooler (if multiple coolers are being shipped) should have its own Chain-of-Custody Record reflecting the samples shipped in that cooler.

- 8. A label containing the name and address of the shipper and the laboratory shall be placed on the outside of the cooler. Provided a commercial carrier is used, the courier of the sample cooler(s) is not required to sign off on the Chain-of-Custody Record as long as the custody seal remains intact and the Chain-of-Custody Record remains inside the cooler.
- 9. Place the completed airbill securely on the top of the cooler. Be sure to use the correct airbill for the day of delivery to the laboratory. Arrange for cooler pickup/drop-off.

**FSOP No.: 029**Rev. No.: 03

Title: Soil Sampling With Encore® Sampler (or Method 5035 Equivalent)

Approved by: Dan B. Brown, CPG

Date: 03/01/07

#### **PROCEDURES**

Sampling activities described in this FSOP include the collection of soil and/or sediment samples from various assessment activities. The following presents the procedures employed by Partners while collecting investigation samples using the Encore® sampler or preservation Method 5035 equivalent.

- Collect appropriate soil and/or sediment sample in accordance with procedures outlined in FSOP No. 012 (Geoprobe Sampling of Soils), FSOP No. 014 (Subsurface Sampling Split Spoon Sampler), FSOP No. 015 (Subsurface Sampling Core Barrel Sampler), FSOP No. 021 (Hand Auger Soil Sampling), FSOP No. 022 (Soil Sampling With Stainless Steel Trowel), and/or FSOP No. 034 (Sediment Sampling).
- 2. Prepare Encore® sampler or other Method 5035 sampling device/kit prior to opening soil sample to minimize exposure of the sample to the atmosphere. Encore® sampler consists of a coring body designed as a single-use sample collection, storage and delivery container. This coring body container should be removed from its packaging and attached to the Encore® reusable T-Handle. Other Method 5035 sampling devices (syringe or other coring device) should be opened, connected to handles (if appropriate), and prepared for sampling. Other Method 5035 sampling kits have several 40mL vials (typically one empty vial for weight, two vials with sodium bisulfate preservative and one vial ready for methanol preservation. Vials should be opened to receive soil samples at this time.
- 3. **Describe** soil sample as specified in FSOP No. 004, which generally conforms to ASTM procedures for soil description. <u>STEPS 3 AND 4 CAN BE REVERSED IF WARRANTED (if description time would compromise sample integrity due to exposure of the sample to the atmosphere)</u>
- 4. **Take sample** in accordance with manufacturer's specific instructions included with each sampling device. Sampling instructions are summarized below:

Encore® Sampling Instructions: Turn T-Handle with T-up and coring body down. Using T-Handle, push Sampler into soil until coring body is completely full. When full, small o-ring will be centered in T-Handle viewing hole. Remove Sampler from soil. Wipe excess soil from coring body exterior (to ensure good tight seal between coring body and cap). Cap coring body while it is still on the T-Handle. Push cap over flat area of ridge and twist to lock cap in place. Cap must be seated to seal sampler. Remove the capped Sampler by depressing locking lever on T-Handle while twisting and pulling Sampler from T-Handle. Lock plunger by rotating extended plunger rod fully counterclockwise until wings rest firmly against tabs. Attach completed tear-off label (from Encore® Sampler bag) to cap on coring body. Return filled Encore® Sampler to original foil zipper bag. Seal bag and put on ice.

Alternate 5035 Sampling Instructions: With single use syringe or coring tool, immediately push coring tool into the soil until sampling chamber is completely full. This is approximately 5-grams of soil. Turning coring tool handle, push 5-gram soil sample into one 40mL vial. Repeat 3 additional times for the remaining 3 vials, making sure that sampling chamber is completely full and insuring that sampling quantities maintain equal 5-gram amounts. Open and pour pre-measured methanol preservative into the proper vial. Immediately cap all vials tightly. Compete the collection information label(s). Place the sampling kit with vials upright in a cooler with ice. Dispose of single use syringe or coring tool with PPE.

SANDY OR LOOSE, UNCONSOLIDATED SEDIMENTS MAY NOT HOLD TIGHTLY IN THESE CORING SAMPLERS. CARE MUST BE TAKEN TO ENSURE FULL SAMPLERS (5-GRAMS) ARE

**FSOP 029** 

# ACQUIRED. SANDY MATERIALS MAY HAVE TO BE POURED/PACKED INTO THE CORING SAMPLER WHILE HOLDING THE TOOL UPSIDE DOWN.

- 5. **Place** an aliquot of sample into a headspace container, **seal** the container and **conduct** sample headspace vapor screening as specified in FSOP No. 007,
- 6. **Decontaminate** the reusable sampling equipment as specified in FSOP No. 005. Encore® sampling devices collect, store and deliver soil samples directly to the lab, and are designed for single use only. Likewise, similar syringes and collection devices for preservation Method 5035 are designed to be disposable, single use only and are <u>not</u> to be decontaminated for reuse. After sample collection is completed, dispose of used 5035 syringes and collection devices with PPE from the job site.
- 7. **Complete the Chain-of-Custody Form** including all dates and times of samples collected. Include trip blanks and duplicate samples on this form by using a unique sample location number.

**FSOP 029** 

**FSOP No.: 031** Rev. No.: 01

Title: Photoionization Detector (PID) Operations - Model 580B

Approved by: Dan B. Brown, CPG

Date: 03/01/07

#### **OVERVIEW**

Activities described in this FSOP include the operation and calibration of photoionization detectors (PIDs), specifically the Model 580B manufactured by ThermoEnvironmental. While specific operation and calibration methods will vary from model to model, this FSOP provides an overview of the basic operations of a PID to be followed by field personnel. Different PIDs will require adherence to the model specific instruction books provided by the manufacturer or rental company.

The PID is a portable, nonspecific, vapor/gas detector employing the principle of photoionization to detect a variety of chemical compounds, both organic and inorganic, in air. The PID is a useful general survey instrument at hazardous waste sites. Several different probes, each containing a different UV light source, are available for use with the PID. Common energies are 9.5, 10.2, and 11.7 eV. All three detect many aromatic and large molecular hydrocarbons. The 10.2 eV and 11.7 eV probes, in addition, detect some smaller organic molecules and some halogenated hydrocarbons. The 10.2 eV probe is the most useful for environmental response work, as it is more durable than the 11.7 eV probe and detects more compounds than the 9.5 eV probe.

#### **PROCEDURES**

PID operation and calibration will be conducted in accordance with the manufacturer's/rental company's instructions attached to this FSOP. A general breakdown is as follows:

- Start up equipment according to manufacturer directions. Allow at least 5 minutes for unit to warm up and equilibrate to site conditions. Make sure that a moisture filter is installed in-line between the sampling probe and the PID unit. Spare filters should be located in the PID carrying case.
- 2. **Prepare calibration gas and zero unit with ambient air**, provided that air source is not contaminated. Use zero gas if ambient air is contaminated.
- 3. Calibrate unit with calibration gas provided. Upon completion of calibration, screen the calibration gas with the unit to verify that unit is functioning properly. Unit should be ready for use. Record calibration readings in fieldbook.
- 4. Periodically double check the unit with the calibration gas to verify that the unit is functioning properly. If unit is out of calibration, redo the calibration/zeroing procedures and continue to check the unit. If unit does not seem to hold calibration, then the manufacturer or rental company may have to provide another functioning unit for replacement. Do not attempt unit repairs unless authorized by a direct manufacturer or rental company representative.

- 5. **Periodically check battery life in the unit** to assure good operation throughout the day. If applicable, bring backup alkaline batteries or be prepared for AC direct plug in power.
- 6. Upon completion of use, **double check the unit with calibration gas** to verify that readings are within acceptable limits. Record final readings in field book. Turn off unit and store properly in carrying case. Upon arrival from the field, put unit on AC power to charge batteries for the next day. Notify Field Equipment Supervisor or rental company if any repairs need to be made to the equipment.

#### SOME LIMITATIONS TO THE PID UNIT

- 1. The PID is a nonspecific total vapor detector. It cannot be used to identify unknown substances; it can only approximately quantify them.
- 2. The PID must be calibrated to a specific compound.
- 3. The PID does not respond to certain low molecular weight hydrocarbons, such as methane and ethane. In addition, a PID may not detect a compound if the lamp has a lower energy than the compound's ionization potential.
- 4. Certain toxic gases and vapors, such as carbon tetrachloride and hydrogen cyanide, have high ionization potentials and cannot be detected with a PID.
- 5. Certain models of PID instruments are not intrinsically safe. Some models should be used in conjunction with a Combustible Gas Indicator. The ISPI-101 is intrinsically safe, however.
- 6. Electrical power lines or power transformers may cause interference with the instrument and thus cause measurement errors. Static voltage sources such as power lines, radio transmissions, or transformers may also interfere with measurements.
- 7. High winds and high humidity will affect measurement readings. The PID may become unusable under foggy or humid conditions. An indication of this is the needle dropping below zero, a slow constant climb on the read-out dial, or a unit that will not return to zero.
- 8. The lamp window must be periodically cleaned to ensure ionization of the new compounds by the lamp (i.e., new air contaminants).
- 9. The PID measures concentrations from about 1-2000 ppm, although the response is not linear over this entire range. For example, if calibrated to benzene, the response is linear from about 0-600 units above background. This means the PID reads a true concentration of benzene only between 0 and 600. Greater concentrations are detected at a lower level than the true value. The HNU is a direct reading instrument. Readings are interpreted as units above background rather than ppm.
- 10. This instrument is not to be exposed to precipitation (rain). The units are not designed for this service.
- 11. Do not use this instrument for head space analysis where liquids can inadvertently be drawn into the probe.
- 12. The PID is calibrated in accordance with the operations manual using isobutylene as the calibration standard. It is classified as a non-flammable gas, UN #1556 and the proper shipping name is Compressed Gas. The operations manual may also be referred to for alternate calibration to a specific compound.

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# Pine Environmental Services, Inc Thermo Environmental 580-B

Operating Temp: 32 to 105 F

#### Start-un/zeroing/ Calibration

#### Start-up

- Attach probe tip and hydrophobic filter by screwing it to the unit.
- Insert the three prong shorting plug into the back of the unit
  - Ensure that the red marks on the plug and socket are aligned properly. The nub should be on top. If the plug is inserted improperly or twisted, the fuses in the unit could burn out rendering the unit inoperable.
- Press the ON/OFF button to turn the unit on.
- Allow the unit to warm up for 5 min.
   NOTE: If calibrating, now is a good time to fill a tedlar bag with isobutylene.

#### Zeroing/ Calibration

- Press the MODE/STORE button
- The display will read "LOG THIS VALUE? MAX PPM =," Press -/CRSR.
- The display will read "R/COM, -/PARAM, +/ACCESS, S/CLOCK." Press -/CRSR.
- The display will read "CONC, METER, MAX HOLD." Press -/CRSR.
- The display will read "FREE SPACE =: " Press -/CRSR.

(turn over)

- The display will read "RESET TO CALIBRATE." Press Reset.
- The display will read "RESTORE BACKUP + = YES." Press -/CRSR.
- The display will read "ZERO GAS RESET WHEN READY." Ensure that the unit is drawing clean ambient air or from a zero air source. Press RESET.
- The unit will read, "MODEL 580 ZEROING," When it's finished zeroing it will read "SPAN PPM = 0100 "+" TO CONTINUE." The unit comes from Pine Env. set for 100 ppm Isobutylene. If your cal. gas is 100 ppm isobutylene, skip the next two steps. If your gas is not 100 ppm, conduct the following;
  - o Hold down the RESET button with one finger. Use another finger to move the cursor with the -/CRSR button. While still holding down RESET, use the +/INC button to increase each digit (there is no decrease button, when you get to nine it will go back to zero).
  - Match the number to the concentration on your gas cylinder.
- Press the +/INC button.
- The screen will read "SPAN GAS, RESET WHEN READY." Connect the probe tip to a <u>FULL</u> tedlar bag of isobutylene. Press the RESET button. If the pump sounds like its restricted, the bag is not open enough.
- The display will read, "MODEL 580 CALIBRATING," followed by "RESET TO CALIBRATE". Press the MODE/STORE button to return to the run mode.
   Verify that the unit reads the gas properly.
- The unit is now ready for use.

NOTE: In the run mode, the RESET button will reset the max ppm reading. This is useful to read the spike during soil jar readings. **FSOP No.: 032** Rev. No.: 01

Title: Water Quality Meter Operations - Horiba U-22

Approved by: Dan B. Brown, CPG

Date: <u>03/01/07</u>

#### **OVERVIEW**

Activities described in this FSOP include the operation and calibration of water quality meters, specifically the Model U-22 manufactured by Horiba. While specific operation and calibration methods will vary from model to model, this FSOP provides an overview of the basic operations of a water quality meter to be followed by field personnel. Different water quality meters will require adherence to the model specific instruction books provided by the manufacturer or rental company.

A portable electronic water quality meter is a microprocessor-based instrument that measures pH, conductivity and temperature (as well as other parameters) with a single probe. Other sensors may also be included within this probe (Dissolved Oxygen, Oxidation Reduction Potential etc.), however, for the purposes of this FSOP, we will be concerned with these three main parameters.

#### **PROCEDURES**

Water meter operation and calibration will be conducted in accordance with the manufacturer's/rental company's instructions attached to this FSOP. A general breakdown is as follows:

- 1. Start up equipment according to manufacturer directions. Attach the probe cable to the water meter unit. Inspect the probe unit, making sure that the probe tip is covered with the appropriate rubber cap. (Depending on the unit, most manufacturers recommend storage of the probe within its cap, filled with electrode storage solution.) Remove rubber cap and rinse probe several times. Turn unit on and immerse it in clean water, electrode storage solution or 4pH buffer solution for 5-10 minutes prior to calibration.
- 2. **Prepare buffer solutions for calibration.** Carrying case should contain three buffer solutions of different colors and different pH values; 4pH, 7pH and 10pH, as well as a conductivity solution. Some manufacturers will provide an auto-calibration solution that combines several calibration parameters in one solution.
- 3. Calibrate unit with buffer solutions provided, in accordance with manufacturer's instruction sheet. Rinse probe thoroughly before moving on to a different buffer solution so as to not dilute any of the buffer solutions. Upon completion of calibration, check the other buffer solutions with the unit to verify that unit is functioning properly. Unit should be ready for use. Record calibration readings in fieldbook.
- 4. **Periodically double check the unit with the buffer solutions** to verify that the unit is functioning. Make sure probe is completely clean before placing it into any buffer solutions. If unit is out of calibration, redo the calibration procedures and continue to check the unit. If unit does not seem to hold calibration, then the manufacturer or rental company may have to

- provide another functioning unit for replacement. Do not attempt unit repairs unless authorized by a direct manufacturer or rental company representative.
- 5. **Periodically check battery life in the unit** to assure good operation throughout the day. If applicable, bring backup alkaline batteries or be prepared for AC direct plug in power.
- 6. Upon completion of use, double check the unit with calibration buffer solutions to verify that readings are within acceptable limits. Record final readings in field book. Turn off unit and store properly in carrying case. Most probe units should be stored with the rubber cap in position, filled with electrode storage solution to keep the probe wet until the next usage. Notify Field Equipment Supervisor or rental company if any repairs need to be made to the equipment.

#### **GENERAL USAGE**

# Additional information regarding water quality meter usage during water sampling events are presented within FSOP No. 001.

Measure temperature, pH, and conductivity of the groundwater from the first pump stoke or first bailer volume; a clean container may be used to hold the liquid emptied from the pump or bailer to conduct measurements. It is usually easier to record temperature and conductivity first, followed by pH (using either the pH/conductivity meter or pH strips). Empty the container into another container, bucket, or drum; rinse the container with distilled water in anticipation of the next well volume sample.

For some projects it may be necessary to measure dissolved oxygen. While a downhole dissolved oxygen measurement is preferred, equipment and well limitations may require completing this measurement at the surface. If dissolved oxygen measurements are made, complete before taking other field measurements.

Measure the temperature, pH, and conductivity approximately every half well-volume during **purging.** Record the values on the Groundwater Sampling Log. If the values are stable (within 10%) after three well volumes, sample collection may begin. If the values are not stable, keep purging until the values become stable, but do not remove more than five (5) well volumes. If stability is not reached, note on the Groundwater Sampling Log. Once stability has been reached (after three well volumes are purged) or a maximum of five well volumes are removed, collect the groundwater sample.

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# Pine Environmental Services, Inc <u>Horiba U-22</u>

Operating and Storage Temp: 32 to 120 F

# Start-up and calibration

- Turn the unit on by pressing the power button.
- Fill the calibration cup to the lower fill line with the auto-cal solution.
- Remove the storage cup from the probe guard. On some units, the storage cup is the cal cup.
  - DO NOT REMOVE THE PROBE GUARD. THE PROBES ARE VERY FRAGILE.
- Submerge the probes and guard into the Horiba auto-cal solution.
- Ensure that the solution level is within the shaded area.
- Wait for the readings to stabilize. Use the "Meas" (measure) button to scroll through the parameters.
- Once the readings are stable, press the cal button, then the enter button.
- While the auto-calibration is in progress, the screen will read "wait" and the brackets around each parameter will flash.
- Confirm the readings when the auto-cal is finished.
  - o pH :4.01
  - o COND: 4.49 mS/cm
  - DO : depends on temp. (see chart on pg.54 in manual)
  - o ORP : between 200 and 300
- The unit is now ready for use.

NOTE: If any error messages appear, check the level of the solution, wait longer for the readings to stabilize, and recalibrate.

**FSOP No.: 035** Rev. No.:0

Title: Low Flow Sampling Procedures for Groundwater Monitoring Wells

Approved by: Dan B. Brown, CPG

Date: 10/1/08

#### **SUMMARY**

- 1. Obtain well numbers(s), well diameter, total depth of well (s), and top of casing elevation and other requirements from the Project Manager.
- 2. Assemble essential sampling equipment.
- 3. Once onsite, note condition of each well and enter information on Groundwater Sampling Log.
- 4. Measure water level to nearest 0.01 feet with a water level indicator; measure nonaqueous liquid, if present, with an interface probe.
- 5. Calculate well volumes on the Groundwater Sampling Log.
- 6. Purge groundwater in conjunction with measuring water quality parameters until stabilization is achieved.
- 7. Collect ground water samples.
- 8. Based on project objectives, collect quality assurance/quality control (QA/QC) samples.
- 9. Complete Chain-of-Custody form.
- 10. Ship samples to the laboratory in accordance with FSOP No. 027.

#### PROCEDURES FOR LOW FLOW SAMPLING MONITORING WELLS

- 1. Prior to low flow sampling, **obtain the following information:** the well number (s), well diameter, total depth of the well(s), the top of casing elevation for the well(s), and other pertinent information. This information will be supplied by the Project Manager (PM) as part of the Sampling and Analysis Plan or other scope of work description and should be entered onto the Groundwater Log. This information is needed to determine the amount of liquid in the well(s) and may be used to determine the amount of liquid to remove from the well(s) to obtain a representative groundwater sample. If this information is not available, measure the well casing diameter and total well depth prior to sampling. Do not use a water level recorder or interface probe to determine the total well depth; use a tape measure or a weighted line.
- 2. Prior to leaving the office, assemble all of the essential equipment, including fluid level meter, bladder pump with controller, air compressor, water quality meter, sample bottles and safety equipment, to complete sample collection. The sample bottles, complete with labeling, are available from the Partners laboratory coordinator or contract laboratory.
- 3. Once at the site, **inspect each well.** Note abnormalities including, but not limited to: is the well locked, is the well top cracked or broken if the well has casing above ground, is the casing still upright or is it tilted due to contact with vehicles or machinery, is the casing intact or broken? Note the well condition on Groundwater Sampling Log. Notify the PM of any suspicious or unusual conditions.
- 4. **Measure water level and non-aqueous liquid thickness** to nearest 0.01 feet. Measure water level with a water level indicator, measure non-aqueous liquid thickness with an interface probe. Record result on Groundwater Sampling Log. Record measurements even if the well will not be sampled due to presence of non-aqueous liquid. The interface probe should not be used in wells that are not suspected or demonstrated to contain free product. Decontaminate the water level meter and interface probe with distilled water (and a non-phosphate detergent, if necessary) between wells or anytime the equipment is used in wells containing non-aqueous liquids. If well is dry, note on Groundwater Sampling Log.

Do not purge or sample a well, if a measurable thickness of non-aqueous liquid is present. Purging should be ceased and no sample should be collected if non-aqueous liquid is observed during purging. However, if a sheen (i.e., non-measurable thickness) of non-aqueous liquid is present the well should be sampled.

5. To obtain a representative sample from the well, it may be necessary to **remove (purge) the equivalent of three well volumes of liquid** from the well. To determine how many gallons of water need to be purge, calculate well volume using the equations and conversion factors found on the Groundwater Sampling Log. Once the amount of liquid to be removed has been determined begin purging.

If the well goes dry during purging, begin sample collection when there is sufficient water in the well to meet the analytical requirements.

6. Low-flow purging and sampling should be accomplished by using a pneumatically controlled bladder pump. To begin low-flow sampling and purging, set the bladder pump depth in the center of the well screen interval to prevent any disturbance of the sediments at the bottom of the well. Turn on the bladder pump controller to the lowest speed setting and increase the speed until water begins to discharge. Refer to FSOP No. 001 for more information about containerizing purge water removed from monitoring wells. Check the water level in the monitoring well to make sure there is little to no drawn down (<0.1m) or draw down is stabilized. Pumping rate adjustments should be made within the first fifteen minutes of purging. Ideally, the pumping rate should be adjusted to achieve flow rates between 100 mL/min to 500 m/L/min. Using a flow through cell water quality meter (such as the Horib-U22) measure the temperature, pH, specific conductivity, oxidation-reduction potential, turbidity, dissolved oxygen and temperature approximately every three (3) to five (5) minutes while purging. Record the values on the Groundwater Sampling Log. Once the values meet stabilization criteria (see table on following page), sample collection may begin. If the values are not stable, keep purging until the values become stable, but do not remove more than six (6) well volumes. If stability is not reached, note on the Groundwater Sampling Log. Once stability has been reached (or if stability is not

**FSOP 035** 

reached, but after three well volumes are purged) or a maximum of six well volumes are removed, collect the groundwater sample.

Parameter	Stabilization Citeria
рН	± 0.1 standard units*
specific conductivity	± 3%
Oxidation-reduction potential (ORP)	± 10 millivolts
turbidity	± 10% (when > 10 NTUs) maintained at <10 NTUs, consider stabilized
dissolved oxygen (DO	± 0.3 milligrams per liter
temperature	± 0.5 Degrees Celsius

7. Once water quality parameters are stabilized; collect samples in the order of priority listed below. This priority is based on the stability of the analytes when the groundwater sample is exposed to air, atmospheric pressure, and temperature.

Dissolved oxygen

Volatile (purgeable) organics [Method 8240, 8260, 8010, 8021, 8015 (gasoline), 601, 602, 624]

Total organic carbon

Total organic halogens

Temperature, pH, conductivity

Extractable (semi-volatile) organics [Methods 8270, 8015, (diesel), 625, 8100]

Total metals (Methods 6010 ICP, 7000 series)

Dissolved metals (Methods 6010 ICP, 7000 series)

Phenols

Cvanide

Sulfates

Turbidity

Nitrates and ammonia

Radionuclides.

Enter information about sample containers and analytical requirements on Groundwater Sampling Log.

8. For quality assurance/quality control (QA/QC) purposes and according to the project objectives, QA/QC samples should be prepared or collected. Refer to FSOP No. 017 for more information about QA/QC samples.

Only if determined acceptable under the applicable regulatory program being pursued, filter and preserve the sample aliquots, as necessary. Filtration and preservation should be completed at the well or at another on-site location, if possible. Enter filtration and preservation information on Groundwater Sampling Log. Refer to FSOP No. 017 for more information about filtering and preserving samples.

- 9. Complete the Chain-of-Custody Form, including all dates and times of samples collected. Include blanks and duplicate samples on this form.
- 10. Ship the samples to the laboratory in accordance with FSOP No.: 027

**FSOP No.: 041** Rev. No.: 0

Title: Soil Vapor Sampling Procedures

Approved by: Dan B. Brown, CPG

Date: 3-02-10

#### **SUMMARY**

Sampling activities described in this FSOP are for the procedures to construct and install sub-slab and soil vapor probes. The sub-slab and/or soil vapor probes will be used to collect soil vapor samples for laboratory analysis.

Partners recognizes that each project is unique and that health and safety issues related to soil vapor sampling will vary. Therefore, the collection of air samples with these procedures will also be conducted in accordance with the site specific Health and Safety Plan (HSP).

This Field Standard Operating Procedure (FSOP) has been adopted by Partners with minor revisions to the Sample Collection and Evaluation of Vapor Intrusion to Indoor Air, Guidance for Ohio EPA's Remedial Response and Voluntary Action Programs, dated April, 2010, and prepared by the Ohio Environmental Protection Agency (OEPA), Division of Emergency and Remedial Response, Assessment, Cleanup and Reuse Section

# FSOP 041a - Procedures for Active Soil Gas Collection Using Direct-Push Systems

### 1.0 Scope and Application

- 1.1 Vapor intrusion is defined as vapor phase migration of volatile organic compounds into occupied buildings from underlying contaminated ground water and/or soil. Soil gas surveys provide information on the soil atmosphere in the vadose zone that can aid in assessing the presence, composition, source, and distribution of contaminants. The purpose of this document is to provide guidance for conducting soil gas sampling, and shall pertain to active soil gas surveys, whereby a volume of soil gas is pumped out of the vadose zone into a sample collection device for analysis.
- 1.2 Detection of individual constituents by active soil gas sampling is limited by the physical and chemical properties of individual contaminants of concern and the soil characteristics of the site. In general, chemical parameters or criteria to be considered prior to selecting soil gas sampling activities are as follows:
  - ♦ Vapor Pressure > 0.5 mm Hg
  - ♦ Henry's Law Constant > 0.1
  - ◆ Degree of soil saturation (chemical and/or water) < 80%</li>
  - ♦ Sampling zone is permeable and permits vapor migration
- 1.3 Results from soil gas surveys are used in both qualitative and quantitative evaluations. The quality and reliability of the data is dependent upon many factors, including but not limited to: the DQO's used to develop the sampling plan, the number of sample locations and data points, the selection of the sample locations, the soil characteristics of the site, the distribution of the contaminants in both the vadose and saturated zones, the equipment and personnel used to gather the data, etc. The development of the work

plan should be finalized before any sampling is conducted. The work plan will provide specific information on the type and quality of data gathered during the soil gas sampling event. Any questions regarding data needs and usage should be resolved prior to sampling.

1.4 The routine evaluation of the indoor inhalation pathway at contaminated sites is a relatively recent development. As a result, methods, procedures, and technology related to evaluating the pathway continue to evolve. This guidance pertains to the active collection of soil gas using direct-push systems (i.e. driven probe rod) [see also ITRC Vapor Intrusion Guidance: A Practical Guide, January 2007, Appendix D, Section 4]. While this guidance is, in part, prescriptive, OEPA does not intend for this guidance to be overly limiting with respect to the use of other appropriate methods, procedures, and equipment for measuring concentrations of chemicals of concern in soil gas.

#### 1.5 Limitations

- 1.5.1 A soil gas survey is only applicable to volatile contaminants;
- 1.5.2 Any barrier that interferes with vapor migration such as perched water, clay or man-made structures can lead to low or false negative readings, or may produce localized areas of high concentrations;
- 1.5.3 Soil gas readings taken within 24 to 48 hours of heavy precipitation can produce drastically reduced or non-existent readings;

NOTE: The greater the separation between the contamination source and the sample location, the greater the possible impact of biodegradation or abiotic transformation.

#### 2.0 Health and Safety Warnings

2.1 Overhead and Buried Utilities

The use of direct push systems on a site within the vicinity of electrical power lines and other utilities requires that special precautions be taken by the operators. Underground electrical utilities are as dangerous as overhead electricity. Be aware and always suspect the existence of underground utilities (water, natural gas, cable/phone lines, fiber optic cables, storm water & sewer lines, etc.).

REMEMBER.....Call the following at least 48 hours before initiating intrusive activities:

Ohio Utilities Protection Service (OUPS): 800-362-2764

8

Oil & Gas Producers Underground Protection Service (OGPUPS): 800-925-0988

2.2 Operators must wear OSHA-approved Personal Protective Equipment (PPE). Refer to the site specific Health and Safety Plan.

### 3.0 Apparatus and Materials

3.1 The following is a list of equipment, tooling, and supplies typically used for soil gas sample collection:

#### PPE:

Hearing protection

Nitrile (or similar) disposable gloves

Steel-toed boots

Safety glasses

Leather gloves

Hard hat

# Equipment/Tooling/Supplies needed for all probing:

4-foot probe rods

Inner Extension Rods (48")

Drive Cap

Miscellaneous tools

Bentonite pellets/granules

2-foot probe rods

· Rod Grip Pull System

Pull Cap

Logbook

# Soil Gas Sampling:

Expendable Point Holder

Expendable Drive Points w/ O-ring

Adapter for ¼" tubing w/ O-ring

Tediar<sup>®</sup> gas sampling bags (1 L)
 w/ bag sampler (e.g. Lung Box)

Implant Expendable Point Holder

Air tight fittings/valves

Expendable Point Popper

Plastic or stainless 3-way valves

Plastic of stainless 3-way versions
 Equipment for leak testing

• 1/4" Tubing 20/40 grade sand

Implants (stainless steel aluminum, ceramic, or plastic)

Funnel

Vacuum canisters (e.g.

Summa®)

 60cc Syringe Multi-gas meter

#### Equipment Clean-Up:

Decontamination Supplies

Various Brushes

Pressurized Sprayer

Polyethylene Sheeting

Non-phosphate Soap

Tap & ASTM Water

Wash Tubs/Buckets

NOTE: Nylon tubing is preferred over Teflon<sup>®</sup> and polyethylene due to lower adsorption. Nylon tubing is more flexible and easier to work with than stainless steel tubing.

### 4.0 Summary of Probe Installation Methods

# 4.1 Post-Run Tubing System

This is a temporary, single use application for collecting a grab soil gas sample. Using the post-run tubing system (PRT), probe rods are driven to the desired depth, and then internal tubing is inserted and sealed for soil gas sampling. Using the inner tubing for soil gas collection has many advantages - potential for leakage is reduced, dead air volume that must be purged is reduced, and decontamination problems are reduced as the sample does not contact the rod bore.

- 4.1.1 Clean all parts prior to use. Inspect all probe rods and clear them of obstructions. Install O-rings on the PRT expendable point holder and the PRT adapter.
- 4.1.2 Test fit the adapter with the PRT fitting on the expendable point holder to assure that the threads are compatible and fit together smoothly.

NOTE: PRT fittings are left-hand threaded and must be rotated counterclockwise to engage the point holder threads.

4.1.3 Push the PRT adapter into the end of the selected tubing. Tape may be used on the outside of the adapter and tubing to prevent the tubing from spinning freely around the adapter during connection - especially when using Teflon tubing. Tape MUST be volatile free.

REMEMBER: The sample will not come into contact with the outside of the tubing or adapter.

- 4.1.4 Attach the PRT expendable point holder (with O-ring) to the female end of the leading probe rod.
- 4.1.5 Attach an O-ring to an expendable drive point and insert into the expendable point holder. Attach the drive cap to the male end of the drive rod and position rod under probe.
- 4.1.6 Drive the PRT rod configuration into the ground, connecting probe rods as necessary to reach the desired depth.
- 4.1.7 After desired depth has been achieved, disengage the expendable drive point. Using the inner rods, insert the expendable point popper to the bottom of the rod string and then slowly pull up on the probe rods using the rod grip pull system. Retract the rods approximately 2"- 4" up to create a void from which to sample the soil gas. Position the probe unit to allow room to work around the sample location.
- 4.1.8 Insert the PRT adapter end of the tubing down the inside diameter of the probe rods.
- 4.1.9 Feed the tubing down the rod bore until it hits bottom on the expendable point holder. Allow approximately 4-6 ft. of tubing to extend out of the hole before cutting it. Grasp the excess tubing end and apply some downward pressure while turning it in a counter-clockwise motion to engage the adapter threads with the expendable point holder. Continue turning until the PRT adapter O-ring

bottoms out in the expendable point holder.

- 4.1.10 Pull up lightly on the tubing to test the engagement of the threads. Failure of the PRT adapter to thread could mean that intrusion of soil may have occurred during driving of the rods or disengagement of the expendable drive point. At this time, the sample train should be tested for leaks.
- 4.1.11 Follow procedures for leak testing found in Section 5.0 of the Sample Collection and Evaluation of Vapor Intrusion to Indoor Air Guidance. Sampling should be conducted once leak testing procedures have been completed.
- 4.1.12 Connect the sampling tubing and follow appropriate purging and sampling procedures. Refer to Section 5.1 for sampling procedures using the bag sampler.

#### 4.2 Installation of Soil Gas Implants

For long-term soil gas monitoring applications (multiple sampling events) or when using evacuated canisters, a stainless steel, aluminum, plastic or ceramic implant can be installed at any depth obtainable by direct push. Implants are inserted down inside the probe rods when the appropriate depth has been achieved.

- 4.2.1 Drive probe rods to the desired depth using the implant point holder and an implant anchor point or expendable drive point. If using steel implants that attach (screw-in) to the drive point, DO NOT disengage the drive point when depth of interest has been reached. If using implants which do not need to be attached to the drive point, the drive point may be disengaged using the point popper. Pull the tool string back approximately 1"- 2" to pop the expendable point out with the point popper.
- 4.2.2 Attach appropriate tubing to the implant. Depending on implant type, Tygon® tubing of appropriate size may be used to connect the implant to the sample tubing. If tubing is pre-cut, allow it to be approximately 48 inches longer than required depth of the implant. Cover or plug the open end of the tubing.
- 4.2.3 Lower the implant and tubing down the inside of the probe rods until the implant hits the top of the anchor/drive point. Note the length of the tubing to assure that proper depth has been reached.
- 4.2.4 If using attachable steel implants, rotate tubing (and attached steel implant) counter-clockwise while exerting a gentle downward force to engage the implants threads into the threads of the expendable point. Pull up on the tubing lightly to test the connection. DO NOT cut the excess tubing at this time.
- 4.2.5 Position the rod grip pull system or rod pull plate on the top probe rod. Exert downward pressure on the tubing while slowly pulling the probe rods up. Pull up about 12 inches (or twice the distance of the implant length) to create an annulus for backfilling with sand or rounded glass beads.
- 4.2.6 If using ¼" O.D. tubing or smaller, thread the excess tubing through the funnel and position it over the top of the probe rod. If using larger tubing, it may not be possible to install the sand since the spacing between the outside of the 3/8" tubing and the probe rods has been reduced and may not allow sufficient flow of sand to the bottom of the tool string. Bridging of the sand is most likely to occur in this scenario.

4.2.7 Pour sand down the inside diameter of the probe rods around the outside of the tubing. Use the tubing to "stir" the sands into place around the implant. Do not lift up on the tubing. It should take less than 150 mL of sand to fill the space around the implant.

NOTE: Backfilling through the rods with sand can only be performed in the vadose zone, not below the water table.

- 4.2.8 Lift the probe rods up an additional 18-24 inches and pour the bentonite seal mixture into place as in Step 4.2.7. The volume to be filled is about 154 mL per foot. It may be necessary to "chase" the seal mixture with distilled water to initiate a seal. This results in a tight seal preventing gas migration down the column.
- 4.2.9 After the probe rods have been removed, cut the tubing to a manageable length, attach a 3-way valve connector or air tight (e.g. Swagelok®) plug, and mark the location with a pin flag or stake. Attach a piece of tape to the tubing indicating the depth at which the implant was set for future reference when sampling. At this time, the sample train should be tested for leaks.
- 4.2.10 Follow procedures for leak testing found in Section 5.0 of the Ohio EPA Remedial Response and Voluntary Action Programs' guidance Sample Collection and Evaluation of Vapor Intrusion to Indoor Air. Sampling should be conducted once leak testing procedures have been completed.
- 4.2.11 The point is ready for sampling now. Refer to Section 5.0 for sampling procedures using the bag sampler (e.g. Lung Box) or vacuum canister (e.g. Summa® or Silco).
- 4.2.12 For a more permanent soil gas implant, the sample point can be finished with the installation of an enclosed riser pipe protector, cap, and completed in a concrete pad.

## 5.0 Sample Collection Methods

Four common methods of sample collection for VOCs are discussed in this SOP. Two of the methods use Tedlar bags as sample containers while the third method uses evacuated canisters and the last method adsorbents. DQOs for the project may determine which sample collection method is used.

## 5.1 The Lung Box Sampler (Bag Samplers)

The Lung Box allows direct filling of a Tedlar<sup>®</sup> air sample bag using negative pressure without passing gas through the pump. This eliminates the risk of contaminating the pump or the sample. The Lung Box pictured below includes an in-line pump. Other types of bag samplers may require the use of a separate air pump or hand pump.



Semi-permanent soil gas probe location with multi-depth implants. The blue bag sampler is used to collect soil gas samples using 1-liter Tedlar bags. Note that each tube is labeled with the sampling depth; the PVC pipe is used to protect the soil gas tubing.

#### 5.1.1 Sample Preparation and Collection

- Prior to sampling, ambient air needs to be removed from the sample train by purging. Purging of the filter pack is required if sampling occurs within 24 hours of installation. At least three volumes should be removed. For example, the sample tubing can be purged using a syringe with a 3-way valve (~4 cc/ft for 1/4" ID tubing/volume). Other methods may be used as long as a minimum of 3 volumes are purged from the tubing. Once purging is complete, the sample may be collected. Field screening may be performed using a direct reading instrument.
- 5.1.1.2 Install new tubing in the bag sampler before collecting each sample. Place a new Tedlar sample bag (already labeled) inside the bag sampler. Attach the inside portion of the tubing to the inlet valve on the sample bag. Open the sample valve on the sample bag following the manufacturer's instructions. Close sampler lid and secure.
- 5.1.1.3 Attach external part of the inlet tubing to the sample tubing. Make sure that the purge valve is closed (closed for fastest fill rate, open for slower fill rate).
- 5.1.1.4 Turn on the sample pump or initiate hand pumping. While filling, watch through the observation window of the Bag sampler as the Tedlar<sup>®</sup> bag fills with gas. Avoid filling bag more then 80% of its maximum volume. Turn the

pump off when the bag has filled to the desired volume. Do not over fill sample bags. The vacuum pump may be strong enough to break a sample bag.

NOTE: Be sure to watch the sample line for the first sign of water coming up the line. Pulling water up the line is not uncommon, especially in cases where the position of the water table is unknown. This is a good reason why ample lengths of tubing should be used for the sample line. If water is drawn up the tubing, the tubing can be cut before the water reaches the sampling equipment.

NOTE: Exercise extreme caution if filling sample bags with explosive gases.

- Once filling of the sample bag is complete, turn off the pump, open the purge valve to equalize the pressures, unlatch the bag sampler lid and open. Close the sample bag inlet valve by holding the side stem and turning the entire upper portion of the fitting clockwise until snug. Remove the filled sample bag from the internal inlet tubing.
- 5.1.1.6 If measurements with a portable meter are to be made (e.g., oxygen), conduct measurements after collecting the soil gas sample(s).

# 5.2 Peristaltic Pump

- 5.2.1 Connect Teflon sample tubing to the peristaltic pump tubing, then connect the peristaltic pump tubing to the Tedlar bag (already labeled). The exact tubing connection method is up to the sampler. However, ensure that all connections are secure (without leaks). Use hose clamps to secure tubing if needed or desired.
- 5.2.2 Turn on the peristaltic pump and set the pumping rate such that the Tedlar bag fills in approximately one minute (1 liter/min pump rate).
- 5.2.3 Once the gas sample is collected, turn off the pump, close the valve on the bag and then detach the bag from the tubing.
- 5.2.4 Complete the Sample Data Sheet with all applicable information.

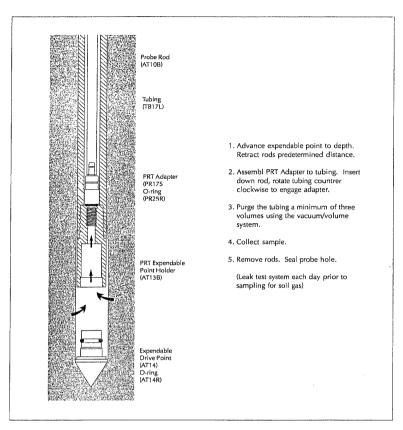
# 5.3 Evacuated Canister

5.3.1 Follow the procedures described in Partners' FSOP 041c

# 5.4 Collection of Samples on Adsorbents

5.4.1 An alternative approach to collecting soil gas in a sample container is to concentrate the soil gas on an adsorbent. This type of method is required for SVOCs and is often used for mercury (generally compounds heavier than naphthalene). Typically, a pump is used to draw soil gas through the adsorbents, and the adsorbent is then analyzed by a laboratory. A variety of adsorbent cartridges and pumping systems are available from commercial vendors. In addition, it is essential that the soil gas be drawn through the adsorbent by the

pump, not pumped through the adsorbent to eliminate the chance for cross-contamination by the pump. It is often recommended that two tubes be used in series to avoid breakthrough losses in areas of suspected higher concentrations. The adsorbent, purge rate, and sample volume must be determined by discussion with the analytical laboratory.



Soil Gas Sampling PRT -- System Operation

Direct Push Days

5

Soil Gas Sampling

#### FSOP 041b - Construction and Installation of Permanent Subslab Soil Gas Ports

# 1.0 Scope and Application

This standard operating procedure (SOP) outlines the procedure used for the construction and installation of permanent subslab soil gas ports. The ports are used to sample the gas contained in the interstitial spaces beneath the floor slab of dwellings and other structures.

#### 2.0 Method Summary

Using an electric hammer drill or rotary hammer, an inner or pilot hole is drilled into the concrete slab to a depth of approximately 2" with the ¾" diameter drill bit. Using the pilot hole as the center, an outer hole is drilled to an approximate depth of 1¾" using the 1" diameter drill bit. The 1" diameter drill bit is then replaced with the ¾" diameter drill bit. The pilot hole is then drilled through the slab and several inches into the subslab material. Once drilling is completed, a stainless steel probe is assembled and inserted into the pre-drilled hole. The probe is mounted as flush as possible with the surrounding slab so it will not interfere with pedestrian or vehicular traffic and cemented into place. A length of Teflon® tubing is attached to the probe assembly and to a sample container or system.

#### 3.0 Sample Preservation, Containers, Handling and Storage

## 3.1 SUMMA® Canister Sampling

After the subslab soil gas sample is collected, the canister valve is closed, an identification tag is attached to the canister and the canister is transported to a laboratory under chain of custody for analysis. Upon receipt at the laboratory, the data documented on the canister tag is recorded. Sample holding times are compound dependent, consult with the laboratory for holding times. Refer to OEPA SOP # 2.5.3 for details on sampling using a Summa Canister.

# 3.2 Tedlar® Bag Sampling

Tedlar<sup>®</sup> bags most commonly used for sampling gas have a 1-liter volume capacity. Typically, Tedlar<sup>®</sup> bags are filled using a lung box. After sampling, the Tedlar<sup>®</sup> bags are stored in a clean cooler (without ice), a cardboard box or an opaque plastic bag at ambient temperature to prevent photodegradation. It is essential that sample analysis be undertaken within 24 to 48 hours following sample collection since VOC's may escape or become altered. Refer to OEPA SOP # 2.5.1, Section 5.1.1, "Sample Preparation and Collection using a Lung Box" for more details.

#### 4.0 Interferences and Potential Problems

The thickness of a concrete slab will vary from structure to structure. A structure may also have a single slab where the thickness varies. A slab may contain steel reinforcement (e.g., rebar). Drill bits of various sizes and cutting ability may be required to penetrate slabs of varying thicknesses or those that are steel reinforced. Ensure that all subslab utilities (public and building specific) have been located and marked prior to installation.

#### 5.0 Equipment/Apparatus

- Hammer drill or Rotary Hammer
- Alternating current (AC) extension cord
- AC generator, if AC power is not available on site
- Hammer or Rotary Hammer drill bit, 3/8" diameter
- Hammer or Rotary Hammer drill bit, 1" diameter
- Portable vacuum cleaner
- $1 \frac{3}{4}$ " open end wrench or 1 medium adjustable wrench
- $2 \frac{9}{16}$  open end wrench or 2 small adjustable wrenches
- Hex head wrench, 1/4"

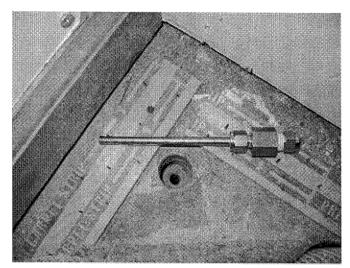
- Tubing or pipe cutter
- Disposable cups, 5 ounce (oz.)
- Disposable mixing implement (i.e., popsicle stick, tongue depressor, etc.)
- Swagelok<sup>®</sup> SS-400-7-4 Female Connector, ¼" National Pipe Thread (NPT) to ¼" Swagelok<sup>®</sup> connector
- Swagelok<sup>®</sup> SS-400-1-4 Male Connector, <sup>1</sup>/<sub>4</sub>" NPT to <sup>1</sup>/<sub>4</sub>" Swagelok<sup>®</sup> connector
- Hose barb adapter, brass, 3/16" barb x ½" MIP (Male Iron Pipe)
- ¼" NPT flush mount hex socket plug
- ¼" outer diameter (OD) stainless steel tubing, pre-cleaned, instrument grade
- Teflon washer ID ¼". ÓD ¾"
- ½" OD Teflon<sup>®</sup> tubing
- Teflon<sup>®</sup> thread tape
- 1/4" OD stainless steel rod, 12" to 24" length
- Swagelok® Tee, optional (SS-400-3-4TMT or SS-400-3-4TTM)

# 6.0 Reagents

- Anchoring cement/grout quick-setting, contaminant free
- Tap water, for mixing anchoring cement/grout

#### 7.0 Procedures

- 7.1 Probe Assembly and Installation
  - 7.1.1 Drill a %" diameter pilot hole approximately 2 inches in depth (Figure 1 in the attached schematic drawings).
  - 7.1.2 Using the ¾" pilot hole as your center, drill a 1" diameter outer hole to a depth of approximately 1 ¾". Vacuum any cuttings out of the hole(**Figure 2**).
  - 7.1.3 Continue drilling the %" inner or pilot hole through the slab and a few inches into the subslab material (**Figure 3**). While drilling, carefully vacuum out any cuttings from the outer hole. (Note: if area highly contaminated with volatiles, volatiles may be drawn into the building, use caution).
  - 7.1.4 Determine the length of stainless steel tubing required to reach from the bottom of the outer hole, through the slab and into the open cavity below the slab. To avoid obstruction of the probe tube, ensure that it does not contact the subslab material. Using a tube cutter, cut the tubing to the desired length.
  - 7.1.5 Attach a measured length (typically 3"-4") of 1/4" OD stainless tubing to the female connector (SS-400-7-4) with the Swagelok® nut. Make sure that the tubing rests firmly in the fitting body and that the nut is finger tight. While holding the fitting body firmly, tighten the nut 11/4 turns.
  - 7.1.6 Insert the ¼" hex socket plug into the female connector. If using a stainless steel socket plug, wrap one layer of Teflon® thread tape around the threads to prevent binding. If using a brass socket plug, no Teflon® tape is needed. Tighten the plug slightly. Do not over tighten. If excessive force is required to remove the plug during the sample set up phase, the probe may break loose from the anchoring cement.



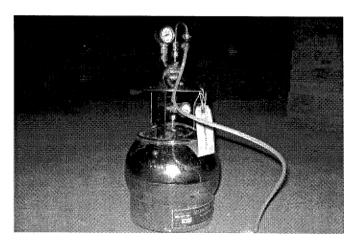
Assembled subslab port ready for installation

- 7.1.7 Place the completed probe into the outer hole to check fit and to ensure that stainless steel tubing is not in contact with the subslab material. Make necessary adjustments to the hole or probe assembly.
- 7.1.8 In a disposable cup or other container, mix a small amount of the anchoring cement or grout. Add water sparingly to create a mixture that is fairly stiff and moldable. Place a spoonful or two of the cement/grout around the stainless steel tubing adjacent to the female connector nut. Mold the cement/grout into a mass around the connector nut and up around the main body of the probe assembly. Slide the Teflon washer onto the stainless steel tube so that it rests next to the cement/grout mixture. The washer will prevent any anchoring cement/grout from flowing into the inner hole during the final step of probe installation.
- 7.1.9 Carefully place the probe assembly into the drilled hole, applying light pressure to seat the assembly. While inserting the probe assembly, work the concrete/grout mixture to fill voids. Clean up cement/grout that discharged out of the hole during placement; avoid getting any of the concrete/grout into fittings or on fitting threads. Allow the cement/grout to cure according to manufacturers instructions before sampling (typically 24 hours). This elapsed time also allows for subsurface conditions to equilibrate prior to sampling (Figure 4).

## 7.2 Sampling Set-Up

- 7.2.1 Wrap one layer of Teflon<sup>®</sup> thread tape onto the NPT end of the male connector, OR wrap one layer of Teflon<sup>®</sup> tape onto the threaded end of the hose barb adapter (3/16" barb x 1/4" MIP).
- 7.2.2 Carefully remove the ¼" hex socket plug from the female connector. Refer to Section 7.3 if the probe breaks loose from the anchoring cement/grout during this step.

- 7.2.3 To ensure that the subslab port has not been blocked by the collapse of the inner hole below the end of the stainless steel tubing, a stainless steel rod, ½" diameter, may be passed through the female connector and the stainless steel tubing. The rod should pas freely to a depth greater than the length of the stainless steel tubing, indicating an open space or loosely packed soil below the end of the stainless steel tubing. Either condition should allow a soil gas sample to be collected. If the port appears blocked, the stainless steel rod may be used as a ramrod in an attempt to open the well. If the well cannot be opened, the probe should be reinstalled or a new probe installed in an alternate location.
- 7.2.4 Screw and tighten the Teflon<sup>®</sup> taped male connector into the female connector, OR screw and tighten the hose barb adapter (3/16" barb x ½" MIP) into the female connector. Do not over tighten. This may cause the probe assembly to break loose from the anchoring cement/grout during this step or when the male connector/hose barb adapter is removed upon completion of the sampling event (**Figure 5**). Refer to Section 7.3 if the probe breaks loose from the anchoring compound during this step.
- 7.2.5 If a co-located subslab sample or split sample is desired, a stainless steel Swagelok® tee, may be used in place of the male connector (**Figure 6**).
- 7.2.6 Attach a length of ¼" Teflon® tubing to the sampling container (e.g., SUMMA canister) or system (e.g., lung box for Tedlar® bag) to be used for sample collection. Connect the other end of the Teflon® tubing to the male connector with a Swagelok® nut, or connect to the barbed hose adapter.



SUMMA canister connected to port and ready for sampling

- 7.2.7 After sample collection, remove the male connector or barbed hose adapter from the probe assembly and reinstall the ½" hex socket plug. Do not over tighten the hex socket plug. If excessive force is required to remove the plug during the next sampling event, the probe may break loose from the anchoring compound. Refer to Section 7.3 if the probe breaks loose from the anchoring compound during this step.
- 7.3 Repairing a Loose Probe Assembly
  - 7.3.1 If the probe assembly breaks loose from the anchoring compound while removing or installing the hex socket plug, the Swagelok® male connector, or the barbed hose adapter, lift the probe assembly slightly above the surface of the concrete slab.
  - 7.3.2 Hold the female connector with the 3/4" open end wrench.
  - 7.3.3 Complete the step being taken during which the probe broke loose, following the

instructions contained in this SOP (*i.e.*, Do not over tighten the hex socket plug, the male connector, or the barbed hose adapter).

- 7.3.4 Push the probe assembly back down into place and reapply the anchoring cement/grout.
- 7.3.5 Modeling clay (verified to be VOC free) may be used as a temporary patch to achieve a seal around the probe assembly until the anchoring cement/grout can be reapplied.

# **8.0** Quality Assurance/Quality Control

An additional co-located soil gas port is installed at a frequency of 10% (1 in 10) or as specified in the site-specific Quality Assurance Project Plan (QAPP). The following general Quality Assurance (QA) procedures apply:

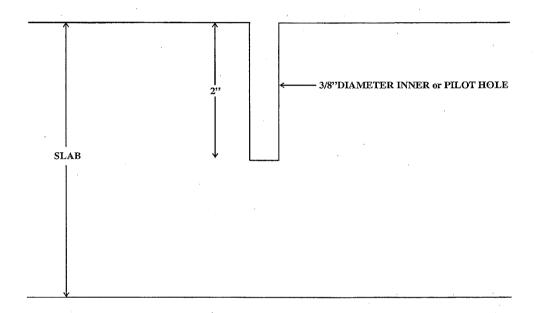
- 8.1 A rough sketch of the area is drawn where the ports are installed, with the major areas noted on the sketch.
- 8.2 A global positioning system (GPS) unit may be used to document coordinates outside of a structure as a reference point.
- 8.3 Equipment used for the installation of sampling ports should be cleaned by heating, inspected and tested prior to deployment.

# 9.0 Health & Safety

When working with potentially hazardous materials, follow site specific health and safety procedures. All site activities should be documented in the site-specific Health and Safety Plan (HASP).

### FIGURE 1

# INNER or PILOT HOLE



### FIGURE 2

## OUTER HOLE

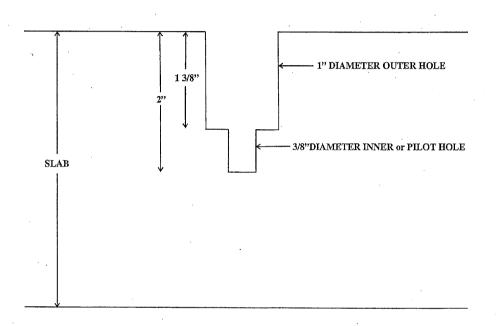


FIGURE 3
COMPLETED HOLE PRIOR to PROBE INSTALLATION

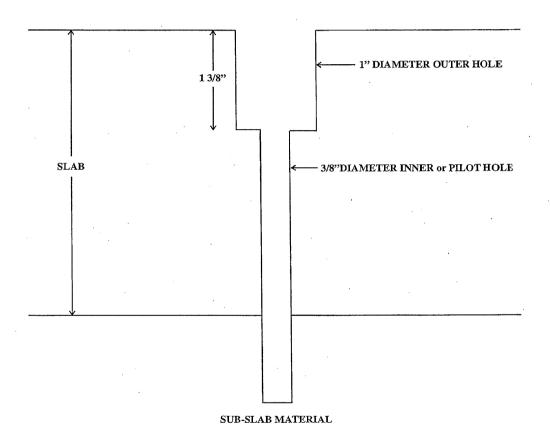
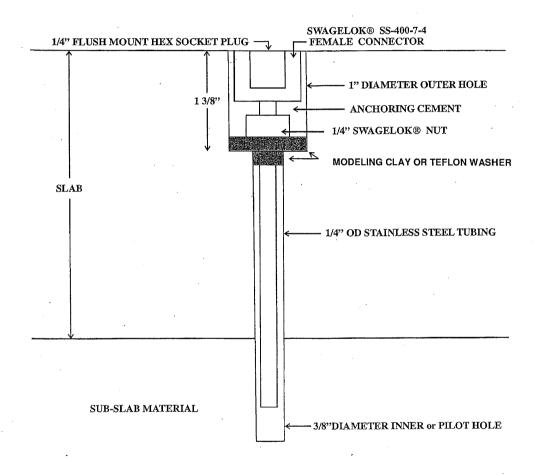
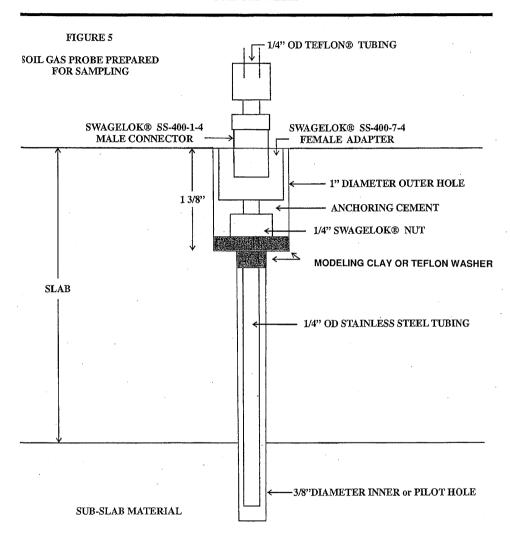
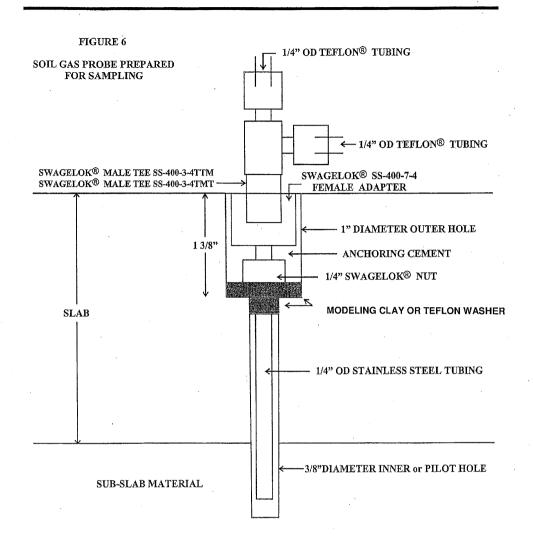


FIGURE 4
SOIL GAS PROBE INSTALLED



# CONSTRUCTION AND INSTALLATION OF PERMANENT SUB-SLAB SOIL GAS WELLS





### FSOP 041c - Procedures for Collection of Indoor Air /Soil Gas Samples

## 1.0 Scope and Application

This standard operating procedure (SOP) describes the procedures used for the collection of indoor air vapor intrusion/soil gas samples. Indoor air samples are collected from predetermined locations within buildings and structures and are typically analyzed for volatile organic compounds (VOCs) using U.S. Environmental Protection Agency Method TO-15.

## 2.0 Method Summary

This method uses an evacuated 6-liter SUMMA® passivated stainless-steel canister for sample collection. A flow regulator with vacuum gauge is attached to the canister in order to collect a volume of sample over a pre-determined time span. Location(s) for the placement of the canisters within the building(s) or structure(s) are also pre-determined in order to focus sampling efforts on potential receptors within the building(s)/structure(s). Additionally, an outdoor, ambient sample must be collected at approximately the same time and for the same time interval as the indoor air samples (see section 8.0). Oral interviews and a written questionnaire for building inhabitants are required prior to the sampling event (this step is necessary to reduce and/or eliminate the impact of inhabitant activities on the analytical results — see Indoor Air Sampling Form). Once the flow regulator is attached to the canister, the valve on the regulator is opened. Notes are made regarding the project, building, location (address of building and placement of canisters), canister ID number, flow regulator ID number, sample start time, canister pressure (inches of Hg), and the samplers performing the sampling event (see "Canister Sampling Data Sheet").

Sample collection times may vary depending on the scope of the project. It is important to return to the sample location at least 10 to 15 minutes prior to the end of the sample collection time. Sampling stops when the flow regulator valve is turned off. Final notes are made regarding the sample stop time and final vacuum pressure.

# 3.0 Sample Preservation, Containers, Handling and Storage

# 3.1 SUMMA® Canister Sampling

After the indoor air/soil gas sample is collected, the canister valve is closed, an identification tag is attached to the canister and the canister is transported to a laboratory under chain of custody for analysis. Upon receipt at the laboratory, the data documented on the canister tag is recorded. Sample holding times are compound dependent, consult with the laboratory for holding times.

### 4.0 Interferences and Potential Problems

Sampling personnel should not handle hazardous substances (such as gasoline), permanent marking pens, wear/apply fragrances, or smoke cigarettes/cigars before and/or during the sampling event.

Care should be taken to ensure that the flow regulator is pre-calibrated to the proper sample collection time (confirm with laboratory). Correctly connecting the flow regulator to the sample canister is vital to eliminate the potential for leaks. Sample integrity is maintained if the sampling time is slightly shorter than the planned sampling time. In other words, if the SUMMA® canister is allowed to completely fill such that there is no pressure/vacuum left in the canister then it may be very difficult for the laboratory technician to extract a sample aliquot for analysis. Sample integrity can also be compromised if the sample event is extended to a point where the canister reaches atmospheric pressure.

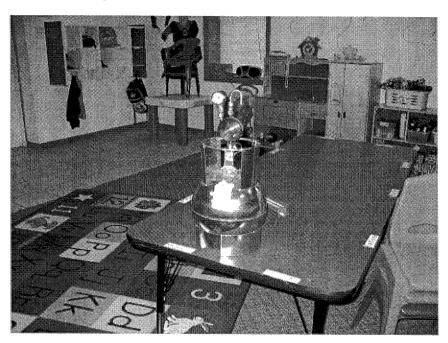
Certain activities within the building(s)/structure(s) can interfere with the collection of a representative indoor air sample. For example, storage of paints, varnish, adhesives, gasoline, and/or oils may create false-positive results during sample collection. Smoking, certain hobbies, and/or equipment maintenance are examples of activities which may impact the ability to collect a

representative sample. Conducting a pre-sampling on-site survey and completing a written questionnaire is important to address such potential inferences.

# 5.0 Equipment/Apparatus

- Stainless steel SUMMA<sup>®</sup> canister(s) (request at least one additional canister as a backup, if possible and make sure that the canisters are labeled with the decontamination information);
- Appropriate flow regulator (properly calibrated for the specified sample collection duration e.g., 30 minutes, 8 hours, 24 hours) with in-line particulate filters and vacuum gauges (request at least one additional gauge, if possible).
- Appropriately-sized open-end wrench, typically 9/16-inch (may want two wrenches so that you can tighten the fitting in two directions at the same time);
- Copy of building survey and resident questionnaire(s):
- PID:
- Sample collection log (Canister Sampling Data Sheet);
- Chain-of-custody (COC) form;
- Field notebook;
- Digital camera.
- 6.0 Reagents
  - N/A
- 6.0 Reagents
  - N/A
- 7.0 Procedures
  - 7.1 Sample Location Determination
    - 7.1.1 Conduct a building/structure survey) to determine potential target receptors and identify potential interferences to sample collection. A pre-sampling inhabitant/worker questionnaire should also be completed at this time. It is important to recognize and eliminate potential interferences to the sample collection process. This should be done at least 48 to 72 hours prior to sample collection.
    - 7.1.2 Sample canisters should be placed at appropriate breathing-zone heights
    - 7.1.3 Special consideration must be given to dirt basements and crawl spaces within the structures.
    - 7.1.4 Indoor Air sampling locations should be in areas that are inhabited and frequently used.
  - 7.2 Sampling Set-Up
    - 7.2.1 Document appropriate information on field log sheet ("Canister Sampling Data Sheet").
    - 7.2.2 Remove brass plug from the SUMMA<sup>®</sup> canister and connect the flow regulator with in-line particulate filter and vacuum gauge to the SUMMA<sup>®</sup> canister. Use the openend 9/16" wrench to gently tighten the connection between the flow regulator and the canister. Do not over-tighten this connection. Do not open the valve on the SUMMA<sup>®</sup> canister (if one is present). Record both the SUMMA<sup>®</sup> canister number and the flow regulator number on the "Canister Sampling Data Sheet". The canister number can be used for sample identification on the COC form.

- 7.2.3 Open the canister/regulator valve. Record the sample start time and the canister pressure.
- 7.2.4 Take a photograph of the canister and surrounding area.
- 7.3 Termination of Sample Collection
  - 7.3.1 Arrive at the sample location approximately 10 to 15 minutes prior to the end of the sampling interval. An examination of the flow regulator should show a slight vacuum left on the gauge (preferably between 2 to 10 inches of Hg on the regulator flow dial). Document this final vacuum pressure and stop sample collection by closing the flow regulator valve.



JMMA<sup>®</sup> canister with flow regulator attached and placed at appropriate breathing a height - ready for sampling.

- 7.3.2 Complete the documentation by recording the stop time on the Canister Sampling Data Sheet as well as any additional field logs.
- 7.3.3 Remove the flow regulator from the SUMMA® canister using the 9/16 open-end wrench. Place the flow regulator into the proper shipping container provided by the lab. Re-install the brass plug on the canister fitting, and tighten with the open-ended wrench.
- 7.3.4 Package the canister and the flow regulator into the shipping container provided by the lab. Note: the SUMMA® canister does not require preservation.
- 7.3.5 Complete the appropriate forms and sample labels as directed by the laboratory. Use the sample start time when completing the laboratory COC and double check canister identification numbers for accuracy.
- 7.3.6 Ship the canisters to the laboratory for analysis.
- 8.0 Quality Assurance/Quality Control

Most indoor air sample analysis will be performed using U.S. EPA TO-15 methodology. Canisters used for sample collection are typically 6-liters and thoroughly cleaned by the laboratory prior to use. Flow regulators will also be thoroughly cleaned by the laboratory. An additional co-located indoor air sample is recommended at a frequency of 10% (1 in 10) or as specified in the site-specific Quality Assurance Project Plan (QAPP). Additionally, an outdoor, ambient sample must be collected at approximately the same time and for the same time interval as the indoor air samples. The following general Quality Assurance (QA) procedures apply:

- 8.1 A rough sketch of the area is drawn where the samples are collected, with the major areas noted on the sketch.
- 8.2 A global positioning system (GPS) unit may be used to document coordinates outside of a structure as a reference point.
- 8.3 Proper completion of associated data sheets, log books and COC is vital to the overall success of the sampling effort.
- 8.4 Photographs showing proper function of the flow regulators at the start and end of the sample time period are recommended. Additional photos of the surrounding area where the samplers are placed are also recommended.

# 9.0 Health & Safety

When working with potentially hazardous materials, follow site specific health and safety procedures. All site activities should be documented in the site-specific Health and Safety Plan (HASP).

# APPENDIX B GPR/EM SURVEY REPORT



January 27, 2012 Behr120014

Mr. Thomas Weir Partners Environmental Consulting, Inc. 31100 Solon Road, Suite G Solon, Ohio 44139

Re: Ground Penetrating Radar and Magnetic Locator Survey
CCLRC Former Burger King Restaurant
9615 Buckeye Road
Cleveland, Ohio

Dear Mr. Weir,

Behr Geo Environmental LLC (Behr) was retained by Partners Environmental Consulting, Inc. (Partners) to complete ground penetrating radar (GPR) and magnetic locator surveys of the parking lot surrounding the former Burger King restaurant at 9615 Buckeye Road in Cleveland, Ohio (Subject Property).

Historic records indicate that the property was used as a gasoline service station prior to being a Burger King restaurant. The intent of the GPR and magnetic locator surveys is to attempt to determine if the USTs remain, and if so, to identify the approximate locations of the tanks. There is no evidence on the ground surface to suggest that USTs remain at the Subject Property.

## **GPR Survey**

A GPR survey was performed over the area shown on **Figure 1** using a Sensors and Software Noggin Plus ground penetrating radar unit with a 500 MHz transducer/receiver antenna over a grid with an approximately 5-foot line spacing. The survey area was defined based upon information provided by Partners personnel and consisted of the paved parking areas on the north, south, and east sides of the existing building. A large amount of debris was present just west of the existing building so that area was only partially investigated.

The data generated by the GPR was interpreted in the field by Behr's geologist. The effective penetration depth of the GPR signal during this survey appeared to be approximately 4-feet below the ground surface over most of the area surveyed. Other than reinforced concrete

Mr. Tom Weir Partners Environmental Consulting, Inc. January 27, 2012

below the asphalt in some areas, there was no evidence of significant near-surface signal interference within the survey area.

No anomalies that were consistent with what would be produced by a UST were present at the Subject Property. Although not part of the scope of this investigation, where suspected utility lines were encountered, their locations were marked with orange paint on the ground surface. Given the limitations of the survey however, it is possible that additional unidentified and unmarked utility locations exist at the subject property.

# **Magnetic Locator Survey**

In conjunction with the GPR survey, a magnetic locator survey was completed at the subject property. The magnetic locator survey was completed over the same area as the GPR survey using a Schonstedt MAC-51Bx Magnetic and Cable Locator on an approximately 10-foot line spacing. Traverses of the subject property with the magnetic locator were completed in a roughly north-south direction over the survey area. The areas of the magnetic locator survey correspond with that of the GPR survey and are shown on **Figure 1**.

The magnetic locator survey identified no magnetic anomalies consistent with what would be produced by a UST at the Subject Property.

Except for limited interference immediately adjacent to the building, there was no other significant signal interference within the survey area.

### **Conclusions**

The GPR and magnetic locator surveys identified no anomalies that are consistent with what would be produced by a UST within the survey area.

## Closing

We appreciate the opportunity to work with you on this project. Please call Behr Geo Environmental LLC at 216-906-7752 if you have any questions or if we can be of further assistance.

Sincerely,

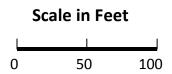
BEHR GEO ENVIRONMENTAL LLC

David W. Behringer, PG, CP

Owner



Approximate Extent of the GPR/Mag Surveys



# Figure 1: GPR/Mag Survey Location Plan

CCLRC - Former Burger King Restaurant 9615 Buckeye Road Cleveland, Ohio

BEHR GEO ENVIRONMENTAL LLC

# APPENDIX C SOIL BORING/MONITOR WELL/SOIL GAS LOGS

- 6	()					PARTNERS E	NVIRONMENT	AL CONSULTING, INC.		
PAI	RTNER	S					SOIL BOR	EHOLE LOG	В	-1
Client:		CCLR	C - Buck	keye Roa	ad		Location:	See Site Plan	1 o	of 1
Date Drille	ed:	1/19/2		,			Total Depth:	12 feet		
Drilling M	ethod:	Direct	Push				Casing Elevation:	Not Applicable		
Drilling Co	ompany:	North	Coast D	rilling			Top of Water:	Not Applicable		
Driller:		Ed Be	_				Backfill Material:	Bentonite		
Geologist		Tom V								
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings	Profile	AODUALT (40)	Geolo	ogic Description		USCS Soil Classification
2.0	0-2'	NA	70%	8.2		ASPHALT (4")				
4.0	2-4'	NA	70%	27.5				coarse SAND with varying amounts of ders (from 3 to 3.2 feet), no odors.		
6.0	4-6'	NA	50%	5.1						
8.0	6-8'	NA	50%	1.7						
10.0	8-10'	NA	70%	3.0			asing amounts of s	e sand and sandstone fragments from 6 shale fragments at depth from 8 to 11.5	i	CL
12.0	10-12'	NA	70%	15.5		Brown and gray se	everely weathered 9	SHALE, no odors or staining.		
_						Boring terminated	at 12 feet bgs due	to sampler refusal.		
14.0						Sample interval sh	nown in <b>bold</b> submi	itted for laboratory analysis.		
16.0										
_										
18.0										
_	ļ									
	]									
20.0										
_										
22.0	]									
22.0										
24.0										
			Clay/Sil	ty Clay		LEGEND	Fine Sand	Decomposed Roc	k/Bedro	ck
			Silt/Clay	yey Silt			Medium Sa	and		
			Sandy (	Clay/Clay	yey Sa	nd	Coarse Sa	and		
			Silty Sa	nd			Fill/Backfill	I		

- 13	()					PARTNERS E	NVIRONMENT	AL CONSULTING, INC.		
PAL	RTNER	S					SOIL BOR	EHOLE LOG	В	-2
Client:		CCLR	C - Buck	keye Roa	ad		Location:	See Site Plan	1 0	of 1
Date Drill	ed:	1/19/2					Total Depth:	12 feet	•	
Drilling M	ethod:	Direct	Push				Casing Elevation:	Not Applicable		
Drilling C	ompany:	North	Coast D	rilling			Top of Water:	Not Applicalbe		
Driller:		Ed Be					Backfill Material:	Bentonite		
Geologist		Tom V								
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings	Profile			ogic Description		USCS Soil Classification
2.0	0-2'	NA	15%	0.7		ASPHALT (4") GR FILL: Brown sand		l, no odors or staining, poor rec	covery.	
4.0	2-4'	NA	NR	-		No recovery.				
6.0	4-6'	NA	60%	1.1		FILL: Brown sand	y CLAY with grave	el, no odors or staining.		
8.0	6-8'	NA	60%	2.4		Brown and gray se	everely weathered S	SHALE, no odors or staining.		
10.0	8-10'	NA	50%	2.4						
12.0	10-12'	NA	50%	313		Gray severely wea no staining.	athered SHALE, ga	soline odor noted at about 10.3	ß feet,	
						Boring terminated	at 12 feet bgs due	to sampler refusal.		
14.0						Sample interval sh	nown in <b>bold</b> submi	itted for laboratory analysis.		
16.0										
=										
18.0										
20.0										
22.0										
24.0										
			Clay/Sil	ty Clay		LEGEND	Fine Sand	Decompo	sed Rock/Bedro	ck
			Silt/Clay	yey Silt			Medium Sa	and		
			Sandy (	Clay/Clay	yey Sa	nd	Coarse Sa	and		
			Silty Sa	nd			Fill/Backfill	I		

	()					PARTNERS E	NVIRONMENT	AL CONSU	LTING, INC.		
PAI	RINER	LS.					SOIL BOR	EHOLE LO	<del></del>	В	-3
Client:		CCLB	C - Bucl	ceve Ro	ad		Location:	See Site Plan		1 0	of 1
Date Drill	ed:	1/19/2		toyo i tot			Total Depth:	12.5 feet			
Drilling M		Direct					Casing Elevation:		<del></del>		
Drilling C		North	Coast D	rilling			Top of Water:	Not Applicable			
Driller:		Ed Be					Backfill Material:	Bentonite			
Geologist	:	Tom V	Veir								
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings	Profile		Geolo	ogic Description	1		USCS Soil Classification
2.0	0-2'	NA	80%	1.9		ASPHALT (6")					
4.0	2-4'	NA	80%	0.9		FILL: Brown sand and trace gray coa	y CLAY with gravel arse slag at 6.5 feet	l, varying amou t, no odors or s	nts of brick fragn taining.	nents,	
6.0	4-6'	NA	80%	0.5							
8.0	6-8'	NA	80%	6.3							
10.0	8-10'	NA	70%	2.3		Brown and gray lea	an CLAY, no odors	or staining.			CL
12.0	10-12'	NA	60%	1.7		Gray severely wea	thered SHALE, no	odors or staini	ng.		
						Boring terminated	at 12.5 feet bgs du	e to sampler re	fusal.		
14.0						Sample interval sh	own in bold submit	ted for laborate	ory analysis.		
16.0					_						
18.0											
20.0											
22.0											
24.0											
			Clay/Sil	ty Clay		LEGEND	Fine Sand		Decompos	sed Rock/Bedro	ck
			Silt/Clay				Medium Sa	and			
			Sandy (		yey Sa	nd	Coarse Sa	nd			
			Silty Sa	ınd			Fill/Backfill				

	()					PARTNERS E	NVIRONMENT	AL CONSULTING, INC.		
PAI	RINER	S					SOIL BOR	EHOLE LOG	В-	-4
Client:		CCLR	C - Buck	keve Roa	ad		Location:	See Site Plan	1 0	f 1
Date Drille	ed:	1/19/2	012	<u> </u>			Total Depth:	12 feet	•	
Drilling M	ethod:	Direct	Push				Casing Elevation:	Not Applicable		
Drilling Co	ompany:	North	Coast D	rilling			Top of Water:	Not Applicalbe		
Driller:		Ed Be					Backfill Material:	Bentonite		
Geologist		Tom V	Veir	•						
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings	Profile			ogic Description		USCS Soil Classification
2.0	0-2'	NA	55%	0.7		ASPHALT (4") GR	AVEL BASE (2")			
4.0	2-4'	NA	55%	0.2		FILL: Brown sand	y CLAY varying am	nounts of gravel and brick fragme	ents,	
6.0	4-6'	NA	30%	0.0		4-inch brick layer a no odors or stainin		or recovery from 6 to 8 feet,		
8.0	6-8'	NA	10%	0.0						
10.0	8-10'	NA	90%	0.2		Brown and gray se	everely weathered S	SHALE, no odors or staining.		
12.0	10-12'	NA	90%	0.4						
_						Boring terminated	at 12 feet bas due	to sampler refusal.		
14.0								itted for laboratory analysis.		
14.0						Sample interval si	own in <b>bold</b> sublin	inted for laboratory analysis.		
_										
16.0										
_										
_										
18.0										
_										
20.0										
_										
_										
22.0										
_										
24.0										
24.0			Clay/Sil	ey Silt		LEGEND	Fine Sand  Medium Sa	and	ed Rock/Bedroc	ck
			Sandy ( Silty Sa		уеу 5а	iiu	Coarse Sal			

- 13	0					PARTNERS E	NVIRONMENT	AL CONSULT	ING, INC	•				
PAI	RTNER	S					SOIL BOR	EHOLE LOG				M	W-	1
Client:		CCLR	C - Buck	keye Roa	ad		Location:	See Site Plan						
Date Drill		1/19/2	012 & 1	/20/2012	2		Total Depth:	12 feet						
Drilling M		Direct					-	96.47 feet (relati	-					
Drilling Co	ompany:		Coast D	rilling			Top of Water:	10.9 feet (48-hou	ır) / 8.9 feet	(72-ho	ur)			
Driller: Geologist		Ed Be	_				Backfill Material:	Monitoring Well						
		_		o s			<u> </u>			ie oi	T.	<sub>ω</sub>		s
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings	Profile		Geologic Desc	cription		USCS Soil Classification	Annular	Materials	) III	Materials
	0-2'	NA	75%	0.2		ASPHALT (6")					conc.			iser
2.0	2-4'	NA	75%	0.4		FILL: Brown sandy	CLAY with gravel	, no odors or stain	ing.		Bentonite / Conc.			1-inch PVC well riser
4.0	4-6'	NA	90%	0.6							Be			1-inch
6.0											er pack			
8.0	6-8'	NA	90%	0.3							sand filte			vell scree
10.0	8-10'	NA	100%	0.7		Brown and gray Cl staining.	LAY with shale fraç	gments, no odors (	or	CL	Fine-grained sand filter pack		<b>Y</b>	1-inch PVC well screen
	10-12'	NA	100%	789							ш		2	+
12.0						Gray severely wea	thered SHALE, ga	soline odor, no sta	aining.					
14.0						Boring terminated Set well at a depth			l.					
14.0						Sample interval sh	own in <b>bold</b> subm	_						
16.0						analysis.								
18.0														
-														
20.0														
22.0														
24.0														
			Clay/Sil	ty Clav		LEGEND	Fine Sand		Decomp	osed F	Rock	/Bedı	ock	
			Silt/Clay				Medium Sa	and	- 1					
			Sandy (	Clay/Cla	yey Sa	nd	Coarse Sa	nd 🗸	′ Initial W	ater Le	vel			
			Silty Sa	nd			Fill/Backfill	▼	Static W	ater Le	evel			

- 19	0					PARTNERS E	NVIRONMENT	AL CONSULTII	NG, INC	•				
PAI	RTNER	S					SOIL BOR	EHOLE LOG				N	IW-	-2
Client:		CCLR	C - Buck	keye Roa	ad		Location:	See Site Plan						
Date Drill		1/19/2	012 & 1	/20/2012	2		Total Depth:	12 feet						
Drilling M		Direct					-	96.32 feet (relative						
Drilling Co	ompany:		Coast D	rilling			Top of Water:	9.6 feet (48-hour)	7.8 feet (	72-hou	ır)			
Driller: Geologist		Ed Be	_				Backfill Material:	Monitoring Well						
Geologist		_				1	<u> </u>			= G		,,	T	"
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings	Profile		Geologic Des	cription		USCS Soil Classification	Annular	Materials	allio :	Well Materials
2.0	0-2'	NA	90%	0.0		ASPHALT (4")					/ Conc.			II riser
4.0	2-4'	NA	90%	0.0							Bentonite / Conc.			1-inch PVC well riser
6.0	4-6'	NA	80%	0.0		FILL: Brown silty 0 7 feet, no odors or		d gravel, trace brick	at					7
8.0	6-8'	NA	80%	0.0		7 loct, no odoro di	Stalling.				Fine-grained sand filter pack			screen
10.0	8-10'	NA	60%	0.0							a-grained sa		¥   	1-inch PVC well screen
10.0	10-12'	NA	60%	5.4		staining.		gments, no odors or			Fin			1-in
12.0	<u> </u>							soline odor, no stair	ning.					
14.0							at 12 feet bgs due	to sampler refusal.  12 ft bgs.						
						Sample interval sh	nown in <b>bold</b> subm	_						
16.0						analysis.								
18.0														
10.0														
20.0														
-														
22.0														
24.0														
			Clay/Sil	ty Clay		LEGEND	Fine Sand		Decomp	osed F	Rock	/Bed	rock	
			Silt/Clay	ey Silt			Medium Sa	and						
			Sandy (	Clay/Cla	yey Sa	and	Coarse Sa	and $\bigvee$	Initial W	ater Le	vel			
			Silty Sa	nd			Fill/Backfill	<b>T</b>	Static W	ater Le	evel			

	0					PARTNERS E	NVIRONMENT	AL CONSULTIN	IG, INC.					
PAI	RTNER	S					SOIL BOR	EHOLE LOG				M	<b>N</b> -3	3
Client:		CCLR	C - Buck	keye Roa	ad		Location:	See Site Plan						
Date Drille	ed:	1/19/2	012 & 1/	/20/2012	2		Total Depth:	12 feet						
Drilling M		Direct					-	97.19 feet (relative						
Drilling Co	ompany:		Coast D	rilling			Top of Water:	11.1 feet (48-hour)	/ 11 feet (	(72-hoı	ur)			
Driller: Geologist		Ed Be					Backfill Material:	Monitoring Well						_
Geologist						1	<u> </u>			= <sup>C</sup>		,,		
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings	Profile		Geologic Desc	cription		USCS Soil Classification	Annular	Materials Profile	Well	Materials
2.0	0-2'	NA	80%	0.0		ASPHALT (4")					/ Conc.			ell riser
4.0	2-4'	NA	80%	0.0							Bentonite / Conc.			1-inch PVC well riser
6.0	4-6'	NA	40%	0.0		FILL: Brown medion of clay, crushed concurtations.		D with gravel and sor feet, no odors or	me					7
	6-8'	NA	10%	0.0							Fine-grained sand filter pack			creen
8.0	8-10'	NA	40%	3.1							grained san			1-inch PVC well screen
10.0	10-12'	NA	40%	106		Brown and gray C	LAY with gravel, no	o odors or staining.		CL	Fine-			1-inch
12.0						Gray severely wea	thered SHALE, ga	soline odor, no stain	ing.					
								to sampler refusal.						
14.0							of approximately on the submit of approximately on the submit of the sub							
16.0						analysis.								
18.0														
20.0														
22.0														
24.0														
			Clay/Sil	ty Clay		LEGEND	Fine Sand		Decomp	osed F	Rock	/Bedro	ock	
			Silt/Clay	ey Silt			Medium Sa	and						
			Sandy (	Clay/Cla	yey Sa	and	Coarse Sa	nd 🗸	Initial Wa	ater Le	vel			
			Silty Sa	nd			Fill/Backfill	▼ 1	Static W	ater Le	evel			

	()					PARTNERS E	NVIRONMENT	AL CONSULTI	NG, INC.	ı				
PAI	RINER	S					SOIL BOR	EHOLE LOG				M	W-4	4
Client:		CCLR	C - Buck	keye Roa	ad		Location:	See Site Plan						
Date Drille	ed:	1/19/2	012 & 1	/20/2012	2		Total Depth:	12 feet						
Drilling M		Direct					4	97.61 feet (relative						
Drilling Co	ompany:		Coast D	rilling			Top of Water:	9.6 feet (48-hour)	9.9 feet (7	72-hou	r)			
Driller:		Ed Be					Backfill Material:	Monitoring Well						
Geologist		Tom V			I	I				_ ⊆	I	ı	T	
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings	Profile		Geologic Desc	cription		USCS Soil Classification	Annular	Materials Profile	Well	Materials
2.0	0-2'	NA	80%	0.1		ASPHALT (6")					Conc.			riser
4.0	2-4'	NA	80%	3.9			nts, concrete fragm	, brick fragments, nents, and black fine 4 feet, no staining.	•		Bentonite / Conc.			1-inch PVC well riser
6.0	4-6'	NA	70%	0.1		sana, siigin poiloid	Jam 5461 116111 2 16	4 loot, no staining.			×			1-in
	6-8'	NA	70%	0.0							nd filter pac			screen
8.0	8-10'	NA	70%	0.0		Brown and gray se staining.	everely weathered	SHALE, no odors or			Fine-grained sand filter pack			1-inch PVC well screen
10.0	10-12'	NA	70%	0.0		Gray weathered S	HALE, no odors or	staining.			Fir		ž	÷
12.0						Boring terminated	at 12 feet bgs due	to sampler refusal.						
14.0						Set well at a depth		-						
16.0						Sample interval sh analysis.	own in <b>bold</b> submi	itted for laboratory						
18.0														
16.0														
20.0														
22.0														
24.0														
			Clay/Sil	ty Clay		LEGEND	Fine Sand		Decomp	osed F	Rock	/Bedr	ock	
			Silt/Clay				Medium Sa	and	<u> </u>					
			Sandy (	Clay/Cla	yey Sa	nd	Coarse Sa	nd 🗸	Initial Wa	ater Le	vel			
			Silty Sa	nd			Fill/Backfill	▼	Static W	ater Le	evel			

	0						PARTNERS E	NVIRONMENT	AL CONSULT	ING, INC	•					
PAI	RINER	S						SOIL BOR	EHOLE LOG					ΜV	<b>V-</b> 5	;
Client:		CCLR	C - Buck	keye Roa	ad			Location:	See Site Plan							
Date Drille	ed:	1/19/2	2012 & 1	/20/2012	2			Total Depth:	12 feet							
Drilling M	ethod:	Direct	Push					Casing Elevation:	93.31 feet (relative	ve)						
Drilling Co	ompany:	North	Coast D	rilling				Top of Water:	7.4 feet (48-hour	) / 5.5 feet (	72-hou	r)				
Driller:		Ed Be	_					Backfill Material:	Monitoring Well							
Geologist		Tom V	Veir													
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings		Profile		Geologic Desc	cription		USCS Soil Classification	Annular	Materials	Profile	IIeW	Materials
	0-2'	NA	50%	0.1			CONCRETE (4")	aven and OLAY	with any or all and a se			Conc.				riser
2.0	2-4'	NA	NR	-			brick, no odors or	-	vitri graver and sor	ne		Bentonite / Conc.				1-inch PVC well riser
4.0	4-6'	NA	20%	0.2			·									1-inc
6.0	6-8'	NA	20%	0.2	╢		Brown and gray Cl	LAY, no odors or s	taining.		CL	r pack		V		ـ ا
8.0	6-6	IVA	20%	0.2								sand filter pack		V		vell screen
10.0	8-10'	NA	100%	0.1			Brown clayey SILT	, no odors or stain	ing.		ML	Fine-grained				1-inch PVC well screen
	10-12'	NA	100%	0				andy CLAY, no odo			CL	Fil				<u>-</u>
12.0					₩			at 10 foot base due		1						
14.0								at 12 feet bgs due of approximately 1		l <b>.</b>						
								nown in <b>bold</b> submi	_							
16.0							analysis.									
18.0																
20.0																
_																
22.0																
24.0																
			Clay/Sil	ty Clay			LEGEND	Fine Sand		Decomp	osed F	Rock	κ/Be	edroc	ck	
			Silt/Clay	ey Silt				Medium Sa	and							
			Sandy (	Clay/Cla	ye	y Sa	and	Coarse Sa	nd 🗸	Initial Wa	ater Le	vel				

Fill/Backfill

Static Water Level

Silty Sand

- [1	0					PARTNERS EI	NVIRONMENT	AL CONSULTIN	NG, INC.	ı			
PAI	RINER	S				SOIL 0	SAS IMPLANT	CONSTRUCTION	ON LOG			SG	P-1
Client:		CCLR	C - Buck	keye Roa	ad		Location:	See Site Plan					
Date Drille	ed:	2/14/2		,			Total Depth:	5 feet					
Drilling Me		Direct	Push				Casing Elevation:						
Drilling Co		North	Coast D	rilling			Top of Water:	N/A					
Driller:		Ed Be	rger				Backfill Material:	Soil Gas Implant					
Geologist	:	Tom V	Veir										
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings	Profile		Geologic Desc	cription		USCS Soil Classification	Annular Materials	Profile	Well Materials
2.0	0-2					NOTE: See log fo	r MW-1 Soil gas i	implant SGP-1 place	ad		seal		oing
2.0	2-4					near well location I No soil samples of	MW-1.	impiant our -i piace	au .		Bentonite seal		Implant Tubing
4.0						Two son samples of	namou.				В		dwl
	4-6										Sand	j	
6.0													Implant-
_													
8.0													
10.0													
12.0													
14.0													
_													
16.0													
18.0													
20.0	<u> </u>												
22.0													
24.0													
			Clay/Sil	ty Clay		LEGEND	Fine Sand		Decompo	osed R	ock/l	Bedro	ck
			Silt/Clay				Medium Sa	and					
			_	Clay/Clay	yey Sa	and	Coarse Sa		Initial Wa	ater Le	vel		
			Silty Sa	nd			Fill/Backfill	▼	Static Wa	ater Le	vel		

	0					PARTNERS E	NVIRONMENT	AL CONSULTIN	NG, INC.					
PAI	RTNER	S				SOIL C	GAS IMPLANT	CONSTRUCTION	ON LOG			SG	P-2	2
Client:		CCLR	C - Buck	keye Roa	ad		Location:	See Site Plan						
Date Drille	ed:	2/14/2					Total Depth:	5 feet						
Drilling Mo	ethod:	Direct	Push				Casing Elevation:	N/A						
Drilling Co	ompany:	North	Coast D	rilling			Top of Water:	N/A						
Driller:		Ed Be	_				Backfill Material:	Soil Gas Implant						
Geologist		Tom V		1					ı	_		-	1	
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings	Profile		Geologic Desc	cription		USCS Soil Classification	Annular	Profile	Well	Materials
_	0-2										al		_	
2.0						NOTE: See log fo near boring location	r B-4. Soil gas imp n B-4.	olant SGP-2 placed			Bentonite seal		Implant Tubing	
	2-4					No soil samples of					Bent		Implan	
4.0	4.0										Sand			
6.0	4-6										ďΧ		Implant-	
													Ш	
8.0														
10.0														
_														
12.0														
	]													
14.0														
16.0														
18.0														
_														
20.0														
22.0														
24.0														
		-				LEGEND						-		
			Clay/Sil	ty Clay			Fine Sand		Decompo	sed R	ock/	Bedro	ck	
			Silt/Clay	yey Silt			Medium Sa	and						
			Sandy (	Clay/Clay	yey Sa	and	Coarse Sa	nd $\bigvee$	Initial Wa	iter Le	vel			
			Silty Sa	nd			Fill/Backfill	▼	Static Wa	ater Le	vel			

- [	0					PARTNERS EI	NVIRONMENT	AL CONSULTIN	NG, INC.					
PAI	RTNER	S				SOIL C	SAS IMPLANT	CONSTRUCTION	ON LOG			SG	P-3	3
Client:		CCLR	C - Buck	keye Roa	ad		Location:	See Site Plan						
Date Drille	ed:	2/14/2					Total Depth:	5 feet						
Drilling M	ethod:	Direct	Push				Casing Elevation:	N/A						
Drilling Co	ompany:	North	Coast D	rilling			Top of Water:	N/A						
Driller:		Ed Be					Backfill Material:	Soil Gas Implant						
Geologist		Tom V		1	ı	T				_		1		
Depth	Sample Type & Identification	SPT Blows Per 0.5 feet	Recovery (%)	PID/FID Readings	Profile		Geologic Desc	cription		USCS Soil Classification	Annular	Profile	Well	Materials
=	0-2										al			
2.0		-				NOTE: See log fo near well location I	r MW-3. Soil gas i MW-3. Borehole c	implant SGP-3 place ave observed from 7	ed 7 to		Bentonite seal		Implant Tubing	
	2-4					5 feet bgs. No soil					Bent		Implan	
4.0											Sand			
6.0	4-6										ďΧ		Implant-	
													Ш	
8.0														
10.0														
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24.0														
	l					LEGEND							<u> </u>	
			Clay/Sil	ty Clay			Fine Sand		Decomp	osed R	ock/	Bedro	ck	
			Silt/Clay	yey Silt			Medium Sa	and						
			Sandy (	Clay/Clay	yey Sa	and	Coarse Sa	nd 🗸	Initial Wa	ater Le	vel			
			Silty Sa	nd			Fill/Backfill	▼	Static W	ater Le	vel			

# APPENDIX D LABORATORY REPORTS

Partners Env. Consulting 31100 Solon Road, Ste		Alternate billing information:  Std Quote: PARENVOH040210S			Analysis/Container/Presen					reser	vative	Prepared by:	Chain of Custody Page 1 of <u>Z</u> D039	
Solon, OH 44139	7							 :					₩ ENVIR	ONMENTAL
·	Papert to:									:			SCIENC	CE CORP.
		41 BR	ilin <b>ac</b> e	<u> </u>						. "			12065 Le	banon Road
	Email to:A	الاعتناء المركن ما شرو	ex @pa	artnersenv	.com								Mt. Juliet,	TN 37122
Project Description: CF1 & - B & VEV- Poan	City/ Colle		EVELAN										Phone (6	15) 758-5858
Phone: (440) 248-6005   Client Project #:	ES	SC Key:		7 (1/17				10	10					00) 767-5859
FAX: (440) 248-6374 SOLD, OLA								Sign	S S S				FAX (6	15) 758-5859
Collected by: TOM WAR Site/Facility ID#:	P.(	O.#:				!			- 1					
Collected by (signature): [Rush?] ( Lab Mi	JST Be Notifie	ed) D	ate Resul	ts Needed:		۵	820	5	g	E			CoCode PAREN	VOH (lab use only)
	9ay	%	mail?t	No <b>X</b> Yes	No.	8260	$\tilde{\omega}$	ای	C10-034	\$	88		Template/Prelogin	
	iy	٥,	AX? 🔏		of Cntrs	1	##	74 CB-C1	は	ROZA METAS	A. B.	:	Shipped Via:	
Sample ID Comp/Grab	fatrix* De	epth	Date	Time		9	#		1	N	F		Remarks/Contaminant	Sample # (lab only)
BR-SS-B-1 GRB S	2-	4 1	1912	-	Ъ	X	X	X	X					LS 56915
BZ-55-3-1 DALAE	7-	4		-				X	X					æ
BR-55-B-2	io-	12.	1	-	ط	X	×	x						3
BR-55-B-3	- 2-	4			1			*.			X			ρÝ
TR-55-B-3 DIPLEME	2-	4			i	444					X			05
BR-55-B-3	-ما	8			6	X	X	X						96
BL-55-B-4	4-	<u>-</u> 6			1					X				وم 2
BR-55-MW-1	<u>  6-</u>	2		· <del>-</del>	i					. ;	$\times$			98
BR-55-MW-1	2-	-A	4	•	li					X				-01
*Matrix: SS - Soil/Solid GW - Groundwater WW - Wa	steWater DW	- Drinking	Water C	T - Other								рН _	Ter	mp
Remarks:								۲,	LL. A	/ N S	_	Zo4Flow-	Oti	ner
Relinquished by: (Signature)  Date:  V20/12	Time:	Received I		ture)		-		Sam	ples re dEx	turne	d via:	Mups	Condition:	(lab use only) To
Relinquished by: (Signature) Date:		Received !						Tem	3.10		Botti	les Receive	d:	oK.
Relinquished by: (Signature) Date:	Time:	Received	for the by	y: (Sìgnaldro	<u>)</u>			Date 1/	21/1	<b>7</b> _	Time	ge or	pH Checked:	NCF:

D. 1	14:.	م	lternate billing	; information:	-			-:- Anal	vsis/C	ontai	ner/P	reser	vativ	e	Chain of Custody Page — of —		
Partners Env. Co		_	Std Quote: PARENVOH040210S												Prepared by:	rage vi	
31100 Solon Roa	•	9 6												-	₩ ENVIR	ONMENTAL	
Solon, OH 44139													·		L)IV V IIV		
		Re	eport to: A i -							Ę			::::		· <del>-</del>	CE CORP.	
			AL	Brillia	el			ļ		ļ	ļ				12065 Lel Mt. Juliet,	oanon Road	
		Er	nail to: ABC: (1	whar @be	artnersenv	.com				İ	Ì					ł	
Project Description: CCLRC-Bukke	YE PAN		City/Sate Collected (	Lithan	. Ort										,	15) 758-5858 00) 767-5859	
	Client Project	#:	ESC Key:						\ <u>\</u>	W						15) 758-5859	
FAX: (440) 248-6374	896.11	A					·		<b>8</b>	Sigs	.				27352 (5	,	
Collected by: Town Work	Site/Facility IC		P.O.#:					_	]	\$				-			
Collected by (signature):		b MUST Be	-	Date Resul	ts Needed:		୍ବ	450	J	134	Z	20			CoCode PAREN	VOH (lab use only)	
Homo W-		ame Day ext Day.,	200%   No.   No.			92160			3	N. S.	3			Template/Prelogin	,		
Packed on Ice N (Y)	T	wo Day	50%	FAX? 🔀	•	of			4	Æ	A	2			Shipped Via:		
	Comp/Grab	Matrix*	Depth	Date	Time	Cntrs	1 S	1			M	/F	i.		Remarks/Contaminant	Sample # (lab only)	
PR-55 MW-1 DALAGE	6248	55	2-4	VA/12	:	1					X				·	LSS6915-10	
BR-55-MW-1	i	1	10-12			6	X	Χ	×	X						-11	
RR-MW-SS-MW-Z			4-6		,	6	X	X	<u> </u>				ļ		***	-12	
78-50-MW-Z			10-17						X							-3	
RE-55-MW-3			10-12			6	X	X	×	X						-14	
BR-55-MW-1 DIPLINE	<u> </u>	4	10-12	4	ļ. <u>.</u>	6	X	X			·		'			-15	
EOD BIANK	GRAB	70		1/19/12		7	X	X			X	X				-16	
TRABBANK	BRAS	OT		1/19/12		İ	X	<u>.</u>	15			ļ				-(7)	
				<u> </u>						Ĺ		_			•		
*Matrix: SS - Soil/Solid GW - Groun	dwater <b>WW</b>	- WasteWat	er <b>DW</b> - Dria	nking Water (	OT - Other_									pH _	Te	mp	
Remarks:														Flow_	O1	her	
Relinquished by: (Signature)	Date V20		Rece	wed the Signs	ature	2			Sam	npies i edEx	returna Co	ed via ourier	U U	P\$	Condition:	(lab use only) To	
Relinquished by: (Signature)	Date			ived by: (Signa	ature)				Ten	10:34	2	Bol	ttles F	Received		OK	
Relinquished by: (Signature)	Date	: Time	Rec	eived for lab b	y: (Signato	e)		•	Dat	te: /		Tjø		/&o	pH Checked:	NCF:	



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Tax I.D. 62-0814289

Est. 1970

Al Brillinger Partners Env. Consulting - Solon, OH 31100 Solon Road, Ste. G Solon, OH 44139

# Report Summary

Tuesday January 31, 2012

Report Number: L556915 Samples Received: 01/21/12 Client Project: 896.01A

Description: CCLRC-Buckeye Road

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

# Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140. NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

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Tax I.D. 62-0814289

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REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-01

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-B-1 2-4 FT Sample ID

Project #: 896.01A Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	91.		%	2540G	01/27/12	1
TPH C6 - C12	1.6	0.11	mg/kg	8015	01/22/12	1
Surrogate Recovery-%			3. 3			
a,a,a-Trifluorotoluene(FID)	84.1		% Rec.	8015	01/22/12	1
Volatile Organics						
Acetone	0.078	0.055	mg/kg	8260B	01/22/12	1
Acrylonitrile	BDL	0.011	mg/kg	8260B	01/22/12	1
Benzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Bromobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Bromodichloromethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
Bromoform	BDL	0.0011	mg/kg	8260B	01/22/12	1
Bromomethane	BDL	0.0055	mg/kg	8260B	01/22/12	1
n-Butylbenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
sec-Butylbenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
tert-Butylbenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Carbon tetrachloride	BDL	0.0011	mg/kg	8260B	01/22/12	1
Chlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	ī
Chlorodibromomethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
Chloroethane	BDL	0.0055	mg/kg	8260B	01/22/12	ī
2-Chloroethyl vinyl ether	BDL	0.055	mg/kg	8260B	01/22/12	1
Chloroform	BDL	0.0055	mg/kg	8260B	01/22/12	ī
Chloromethane	BDL	0.0027	mg/kg	8260B	01/22/12	1
2-Chlorotoluene	BDL	0.0011	mg/kg	8260B	01/22/12	1
4-Chlorotoluene	BDL	0.0011	mg/kg	8260B	01/22/12	ī
1,2-Dibromo-3-Chloropropane	BDL	0.0055	mg/kg	8260B	01/22/12	1
1,2-Dibromoethane	BDL	0.0011	mg/kg	8260B	01/22/12	ī
Dibromomethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,2-Dichlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	ī
1,3-Dichlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,4-Dichlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Dichlorodifluoromethane	BDL	0.0055	mg/kg	8260B	01/22/12	1
1,1-Dichloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	ī
1,2-Dichloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1-Dichloroethene	BDL	0.0011	mg/kg	8260B	01/22/12	ī
cis-1,2-Dichloroethene	BDL	0.0011	mg/kg	8260B	01/22/12	1
trans-1,2-Dichloroethene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,2-Dichloropropane	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1-Dichloropropene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,3-Dichloropropane	BDL	0.0011	mg/kg	8260B	01/22/12	1
cis-1,3-Dichloropropene	BDL	0.0011	mg/kg	8260B	01/22/12	1
trans-1,3-Dichloropropene	BDL	0.0011	mg/kg	8260B	01/22/12	1
2,2-Dichloropropane	BDL	0.0011	mg/kg	8260B	01/22/12	1

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-01

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-B-1 2-4 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Di-isopropyl ether	BDL	0.0011	mg/kg	8260B	01/22/12	1
Ethylbenzene	0.0026	0.0011	mg/kg	8260B	01/22/12	1
Hexachloro-1,3-butadiene	BDL	0.0011	mg/kg	8260B	01/22/12	1
n-Hexane	BDL	0.011	mg/kg	8260B	01/22/12	1
Isopropylbenzene	0.0012	0.0011	mg/kg	8260B	01/22/12	1
p-Isopropyltoluene	BDL	0.0011	mg/kg	8260B	01/22/12	1
2-Butanone (MEK)	0.021	0.011	mg/kg	8260B	01/22/12	1
Methylene Chloride	BDL	0.0055	mg/kg	8260B	01/22/12	1
4-Methyl-2-pentanone (MIBK)	BDL	0.011	mg/kg	8260B	01/22/12	1
Methyl tert-butyl ether	BDL	0.0011	mg/kg	8260B	01/22/12	1
Naphthalene	BDL	0.0055	mg/kg	8260B	01/22/12	1
n-Propylbenzene	0.0012	0.0011	mg/kg	8260B	01/22/12	1
Styrene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1,1,2-Tetrachloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1,2,2-Tetrachloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
Tetrachloroethene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Toluene	BDL	0.0055	mg/kg	8260B	01/22/12	1
1,2,3-Trichlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,2,4-Trichlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1,1-Trichloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1,2-Trichloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
Trichloroethene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Trichlorofluoromethane	BDL	0.0055	mg/kg	8260B	01/22/12	1
1,2,3-Trichloropropane	BDL	0.0027	mg/kg	8260B	01/22/12	1
1,2,4-Trimethylbenzene	0.0056	0.0011	mg/kg	8260B	01/22/12	1
1,3,5-Trimethylbenzene	0.0019	0.0011	mg/kg	8260B	01/22/12	1
Vinyl chloride	BDL	0.0011	mg/kg	8260B	01/22/12	1
Xylenes, Total	0.0039	0.0033	mg/kg	8260B	01/22/12	1
Surrogate Recovery						
Toluene-d8	99.8		% Rec.	8260B	01/22/12	1
Dibromofluoromethane	102.		% Rec.	8260B	01/22/12	1
4-Bromofluorobenzene	91.1		% Rec.	8260B	01/22/12	1
Ohio DRO						
C10-C20 Hydrocarbons	BDL	22.	mg/kg	8015M	01/25/12	5
C20-C34 Hydrocarbons	40.	22.	mg/kg	8015M	01/25/12	5
Surrogate Recovery						
o-Terphenyl	62.4		% Rec.	8015M	01/25/12	5
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.18	mg/kg	8270C	01/25/12	5
Acenaphthene	BDL	0.18	mg/kg	8270C	01/25/12	5
Acenaphthylene	BDL	0.18	mg/kg	8270C	01/25/12	5
Benzo(a)anthracene	0.30	0.18	mg/kg	8270C	01/25/12	5

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL) Note:

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L556915-01 (DROOH) - dark/viscous matrix



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G

Solon, OH 44139

January 31,2012

ESC Sample # : L556915-01

Project #: 896.01A

Date Received : January 21, 2012 CCLRC-Buckeye Road : Description

Site ID :

BR-SS-B-1 2-4 FT Sample ID :

Collected By Tom Weir Collection Date : 01/19/12 00:00

Det. Limit Units Dil. Parameter Dry Result Method Date 01/25/12 Benzo(a)pyrene Benzo(b)fluoranthene 0.33 0.18 mq/kq 8270C 5 0.18 0.43 mg/kg 8270C 01/25/12 Benzo(g,h,i)perylene BDL mg/kg 8270C 01/25/12 Benzo(k)fluoranthene 0.18 8270C 01/25/12  $\mathtt{BDL}$ mg/kg Chrysene 0.31 0.18 8270C 01/25/12 5 mg/kg Dibenz(a,h)anthracene  $\mathtt{BDL}$ 0.18 mg/kg 8270C 01/25/12 5 5 0.64 01/25/12 Fluoranthene 0.18 mg/kg 8270C 8270C 01/25/12 01/25/12 5 Fluorene BDI. 0.18 mg/kg 5 Indeno(1,2,3-cd)pyrene 0.18 8270C BDL mg/kg 8270C 01/25/12 5 BDL mg/kg Naphthalene 0.18 0.45 0.18 8270C 01/25/12 Phenanthrene mg/kg 0.18 Pyrene 0.61 mg/kg 8270C 01/25/12 Surrogate Recovery Nitrobenzene-d5 86.6 % Rec. 8270C 01/25/12 2-Fluorobiphenyl 82.7 % Rec. 8270C 01/25/12 5 p-Terphenyl-d14 128. % Rec. 8270C 01/25/12

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-02

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

Sample ID : BR-SS-B-1 DUPLICATE 2-4 FT

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	87.		%	2540G	01/27/12	1
TPH C6 - C12	0.47	0.12	mg/kg	8015	01/22/12	1
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	92.3		% Rec.	8015	01/22/12	1
Ohio DRO C10-C20 Hydrocarbons C20-C34 Hydrocarbons Surrogate Recovery	BDL 29.	23. 23.	mg/kg mg/kg	8015M 8015M	,,	5 5
o-Terphenyl	58.7		% Rec.	8015M	01/25/12	5

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

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12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

ESC Sample # : L556915-03

Project #: 896.01A

January 31,2012

Site ID :

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-B-2 10-12 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	93.		%	2540G	01/27/12	1
TPH C6 - C12	32.	5.4	mg/kg	8015	01/22/12	50
Surrogate Recovery-%			3. 3			
a,a,a-Trifluorotoluene(FID)	97.6		% Rec.	8015	01/22/12	50
Volatile Organics						
Acetone	BDL	2.7	mg/kg	8260B	01/22/12	50
Acrylonitrile	BDL	0.54	mg/kg	8260B	01/22/12	50
Benzene	BDL	0.054	mg/kg	8260B	01/22/12	50
Bromobenzene	BDL	0.054	mg/kg	8260B	01/22/12	50
Bromodichloromethane	BDL	0.054	mg/kg	8260B	01/22/12	50
Bromoform	BDL	0.054	mg/kg	8260B	01/22/12	50
Bromomethane	BDL	0.27	mg/kg	8260B	01/22/12	50
n-Butylbenzene	0.16	0.054	mg/kg	8260B	01/22/12	50
sec-Butylbenzene	0.070	0.054	mg/kg	8260B	01/22/12	50
tert-Butylbenzene	BDL	0.054	mg/kg	8260B	01/22/12	50
Carbon tetrachloride	BDL	0.054	mg/kg	8260B	01/22/12	50
Chlorobenzene	BDL	0.054	mg/kg	8260B	01/22/12	50
Chlorodibromomethane	BDL	0.054	mg/kg	8260B	01/22/12	50
Chloroethane	BDL	0.27	mg/kg	8260B	01/22/12	50
2-Chloroethyl vinyl ether	BDL	2.7	mg/kg	8260B	01/22/12	50
Chloroform	BDL	0.27	mg/kg	8260B	01/22/12	50
Chloromethane	BDL	0.13	mg/kg	8260B	01/22/12	50
2-Chlorotoluene	BDL	0.054	mg/kg	8260B	01/22/12	50
4-Chlorotoluene	BDL	0.054	mg/kg	8260B	01/22/12	50
1,2-Dibromo-3-Chloropropane	BDL	0.27	mg/kg	8260B	01/22/12	50
1,2-Dibromoethane	BDL	0.054	mg/kg	8260B	01/22/12	50
Dibromomethane	BDL	0.054	mg/kg	8260B	01/22/12	50
1,2-Dichlorobenzene	BDL	0.054	mg/kg	8260B	01/22/12	50
1,3-Dichlorobenzene	BDL	0.054	mg/kg	8260B	01/22/12	50
1,4-Dichlorobenzene	BDL	0.054	mg/kg	8260B	01/22/12	50
Dichlorodifluoromethane	BDL	0.27	mg/kg	8260B	01/22/12	50
1,1-Dichloroethane	BDL	0.054	mg/kg	8260B	01/22/12	50
1,2-Dichloroethane	BDL	0.054	mg/kg	8260B	01/22/12	50
1,1-Dichloroethene	BDL	0.054	mg/kg	8260B	01/22/12	50
cis-1,2-Dichloroethene	BDL	0.054	mg/kg	8260B	01/22/12	50
trans-1,2-Dichloroethene	BDL	0.054	mg/kg	8260B	01/22/12	50
1,2-Dichloropropane	BDL	0.054	mg/kg	8260B	01/22/12	50
1,1-Dichloropropene	BDL	0.054	mg/kg	8260B	01/22/12	50
1,3-Dichloropropane	BDL	0.054	mg/kg	8260B	01/22/12	50
cis-1,3-Dichloropropene	BDL	0.054	mg/kg	8260B	01/22/12	50
trans-1,3-Dichloropropene	BDL	0.054	mg/kg	8260B	01/22/12	50
2,2-Dichloropropane	BDL	0.054	mg/kg	8260B	01/22/12	50

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL) Note:

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G

Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-03

Project #: 896.01A

January 21, 2012 Date Received

CCLRC-Buckeye Road Description :

BR-SS-B-2 10-12 FT Sample ID :

Collected By Tom Weir 01/19/12 00:00 Collection Date :

Parameter Dry Result Det. Limit Units Method Date Dil. 0.054 Di-isopropyl ether BDL mq/kq 8260B 01/22/12 50 8260B 01/22/12 Ethvlbenzene 0.89 0.054 50 mg/kg Hexachloro-1,3-butadiene BDL 0.054 mg/kg 8260B 01/22/12 50 0.54 01/22/12 n-Hexane  $\mathtt{BDL}$ mg/kg 8260B 50 Isopropylbenzene 0.054 8260B 01/22/12 50 0.14 mg/kg p-Isopropyltoluene 2-Butanone (MEK)  $\mathtt{BDL}$ 0.054 mg/kg 8260B 01/22/12 50 BDL 0.54 mg/kg 8260B 01/22/12 50 Methylene Chloride 4-Methyl-2-pentanone (MIBK) 01/22/12 01/22/12 BDI. 0.27 mg/kg 8260B 50 8260B BDL 0.54 50 mg/kg Methyl tert-butyl ether Naphthalene 0.054 8260B 01/22/12 BDL ma/ka 50 0.27 01/22/12 0.67 mg/kg 8260B 50 n-Propylbenzene 0.49 0.054 mg/kg 8260B 01/22/12 50 BDL 0.054 8260B 01/22/12 Styrene mg/kg 50 1,1,1,2-Tetrachloroethane BDL 0.054 mg/kg 8260B 01/22/12 50 1,1,2,2-Tetrachloroethane BDL 0.054 mg/kg 8260B 01/22/12 50 Tetrachloroethene BDI. 0.054 mg/kg 8260B 01/22/12 50 0.27 01/22/12 BDL 8260B mq/kq 50 Toluene 1,2,3-Trichlorobenzene 0.054 8260B 01/22/12 BDL 50 ma/ka 1,2,4-Trichlorobenzene 01/22/12 BDL 0.054 mg/kg 8260B 50 0.054 1,1,1-Trichloroethane 8260B 01/22/12 BDL mg/kg 1,1,2-Trichloroethane BDL 0.054 mg/kg 8260B 01/22/12 50 Trichloroethene BDL 0.054 mg/kg 8260B 01/22/12 50 Trichlorofluoromethane BDI. 0.27 mg/kg 8260B 01/22/12 50 01/22/12 0.13 mg/kg 8260B 1,2,3-Trichloropropane BDL 50 1,2,4-Trimethylbenzene 8260B 01/22/12 3.3 1.0 0.054 50 mq/kq 1,3,5-Trimethylbenzene 01/22/12 0.054 mg/kg 8260B 50 Vinyl chloride 01/22/12 BDL 0.054 mg/kg 8260B 50 Xylenes, Total Surrogate Recovery 50 3.7 0.16 mg/kg 8260B 01/22/12 99.5 8260B 01/22/12 50 Toluene-d8 % Rec. Dibromofluoromethane 95.2 % Rec. 8260B 01/22/12 50 4-Bromofluorobenzene 103. 8260B 01/22/12 50 % Rec. Polynuclear Aromatic Hydrocarbons Anthracene BDL 0.035 mg/kg 8270C 01/25/12 Acenaphthene BDL 0.035 mg/kg 8270C 01/25/12 Acenaphthylene BDL 0.035 mg/kg 8270C 01/25/12 1 8270C Benzo(a)anthracene BDT. 0.035 mg/kg 01/25/12 1 01/25/12 Benzo(a)pyrene BDI. 0.035 mg/kg 8270C 1 8270C 01/25/12 Benzo(b)fluoranthene BDL 0.035 mq/kq 1 Benzo(g,h,i)perylene 8270C 01/25/12 BDL 0.035 mq/kq 1 Benzo(k)fluoranthene 8270C 01/25/12 1 BDL 0.035 mg/kg 8270C 01/25/12 Chrysene BDL 0.035 mg/kg Dibenz(a,h)anthracene 0.035 8270C 01/25/12 1 BDL mq/kq

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:



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Tax I.D. 62-0814289

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

Project # : 896.01A

January 31,2012

Site ID :

Est. 1970

ESC Sample # : L556915-03

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-B-2 10-12 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Fluoranthene	BDL	0.035	mg/kg	8270C	01/25/12	1
Fluorene	0.043	0.035	mg/kg	8270C	01/25/12	1
Indeno(1,2,3-cd)pyrene	BDL	0.035	mg/kg	8270C	01/25/12	1
Naphthalene	1.9	0.35	mg/kg	8270C	01/26/12	10
Phenanthrene	0.10	0.035	mg/kg	8270C	01/25/12	1
Pyrene	BDL	0.035	mg/kg	8270C	01/25/12	1
Surrogate Recovery			3. 3			
Nitrobenzene-d5	84.1		% Rec.	8270C	01/25/12	1
2-Fluorobiphenyl	72.9		% Rec.	8270C	01/25/12	1
p-Terphenyl-d14	100.		% Rec.	8270C	01/25/12	1

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-04

Project # : 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-B-3 2-4 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	88.		%	2540G	01/27/12	1
Polychlorinated Biphenyls						
PCB 1016	BDL	0.019	mq/kq	8082	01/26/12	1
PCB 1221	BDL	0.019	mg/kg	8082	01/26/12	1
PCB 1232	BDL	0.019	mg/kg	8082	01/26/12	1
PCB 1242	BDL	0.019	mg/kg	8082	01/26/12	1
PCB 1248	BDL	0.019	mg/kg	8082	01/26/12	1
PCB 1254	BDL	0.019	mg/kg	8082	01/26/12	1
PCB 1260	BDL	0.019	mg/kg	8082	01/26/12	1
PCBs Surrogates			3. 3			
Decachlorobiphenyl	75.1		% Rec.	8082	01/26/12	1
Tetrachloro-m-xylene	77.8		% Rec.	8082	01/26/12	1

Results listed are dry weight basis.
BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:



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Tax I.D. 62-0814289

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-05

Project # : 896.01A

Est. 1970

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-B-3 DUPLICATE 2-4 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	86.		ઇ	2540G	01/27/12	1
Polychlorinated Biphenyls						
PCB 1016	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1221	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1232	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1242	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1248	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1254	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1260	BDL	0.020	mg/kg	8082	01/26/12	1
PCBs Surrogates						
Decachlorobiphenyl	75.9		% Rec.	8082	01/26/12	1
Tetrachloro-m-xylene	69.9		% Rec.	8082	01/26/12	1

Results listed are dry weight basis.
BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:



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Tax I.D. 62-0814289

Est. 1970

January 31,2012

Site ID :

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

ESC Sample # : L556915-06

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-B-3 6-8 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	86.		૪	2540G	01/27/12	1
TPH C6 - C12	0.51	0.12	mg/kg	8015	01/22/12	1
Surrogate Recovery-%			5, 5			
a,a,a-Trifluorotoluene(FID)	93.0		% Rec.	8015	01/22/12	1
Volatile Organics						
Acetone	BDL	0.058	mg/kg	8260B	01/26/12	1
Acrylonitrile	BDL	0.012	mg/kg	8260B	01/26/12	1
Benzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
Bromobenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
Bromodichloromethane	BDL	0.0012	mg/kg	8260B	01/26/12	1
Bromoform	BDL	0.0012	mg/kg	8260B	01/26/12	1
Bromomethane	BDL	0.0058	mg/kg	8260B	01/26/12	1
n-Butylbenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
sec-Butylbenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
tert-Butylbenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
Carbon tetrachloride	BDL	0.0012	mg/kg	8260B	01/26/12	1
Chlorobenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
Chlorodibromomethane	BDL	0.0012	mg/kg	8260B	01/26/12	1
Chloroethane	BDL	0.0058	mg/kg	8260B	01/26/12	1
2-Chloroethyl vinyl ether	BDL	0.058	mg/kg	8260B	01/26/12	1
Chloroform	BDL	0.0058	mg/kg	8260B	01/26/12	1
Chloromethane	BDL	0.0029	mg/kg	8260B	01/26/12	1
2-Chlorotoluene	BDL	0.0012	mg/kg	8260B	01/26/12	1
4-Chlorotoluene	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,2-Dibromo-3-Chloropropane	BDL	0.0058	mg/kg	8260B	01/26/12	1
1,2-Dibromoethane	BDL	0.0012	mg/kg	8260B	01/26/12	1
Dibromomethane	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,2-Dichlorobenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,3-Dichlorobenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,4-Dichlorobenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
Dichlorodifluoromethane	BDL	0.0058	mg/kg	8260B	01/26/12	1
1,1-Dichloroethane	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,2-Dichloroethane	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,1-Dichloroethene	BDL	0.0012	mg/kg	8260B	01/26/12	ī
cis-1,2-Dichloroethene	BDL	0.0012	mg/kg	8260B	01/26/12	1
trans-1,2-Dichloroethene	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,2-Dichloropropane	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,1-Dichloropropene	BDL	0.0012	mg/kg	8260B	01/26/12	ī
1,3-Dichloropropane	BDL	0.0012	mg/kg	8260B	01/26/12	ī
cis-1,3-Dichloropropene	BDL	0.0012	mg/kg	8260B	01/26/12	ī
trans-1,3-Dichloropropene	BDL	0.0012	mg/kg	8260B	01/26/12	ī
2,2-Dichloropropane	BDL	0.0012	mg/kg	8260B	01/26/12	ī
			٥. ٥			

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL) Note:



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-06

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-B-3 6-8 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Di-isopropyl ether	BDL	0.0012	mg/kg	8260B	01/26/12	1
Ethylbenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
Hexachloro-1,3-butadiene	BDL	0.0012	mg/kg	8260B	01/26/12	1
n-Hexane	BDL	0.012	mg/kg	8260B	01/26/12	1
Isopropylbenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
p-Isopropyltoluene	BDL	0.0012	mg/kg	8260B	01/26/12	1
2-Butanone (MEK)	BDL	0.012	mg/kg	8260B	01/26/12	1
Methylene Chloride	BDL	0.0058	mg/kg	8260B	01/26/12	1
4-Methyl-2-pentanone (MIBK)	BDL	0.012	mg/kg	8260B	01/26/12	1
Methyl tert-butyl ether	BDL	0.0012	mg/kg	8260B	01/26/12	1
Naphthalene	BDL	0.0058	mg/kg	8260B	01/26/12	1
n-Propylbenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
Styrene	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,1,1,2-Tetrachloroethane	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,1,2,2-Tetrachloroethane	BDL	0.0012	mg/kg	8260B	01/26/12	1
Tetrachloroethene	BDL	0.0012	mg/kg	8260B	01/26/12	1
Toluene	BDL	0.0058	mg/kg	8260B	01/26/12	1
1,2,3-Trichlorobenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,2,4-Trichlorobenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,1,1-Trichloroethane	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,1,2-Trichloroethane	BDL	0.0012	mg/kg	8260B	01/26/12	1
Trichloroethene	BDL	0.0012	mg/kg	8260B	01/26/12	1
Trichlorofluoromethane	BDL	0.0058	mg/kg	8260B	01/26/12	ī
1,2,3-Trichloropropane	BDL	0.0029	mg/kg	8260B	01/26/12	1
1,2,4-Trimethylbenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
1,3,5-Trimethylbenzene	BDL	0.0012	mg/kg	8260B	01/26/12	1
Vinyl chloride	BDL	0.0012	mg/kg	8260B	01/26/12	1
Xylenes, Total	BDL	0.0035	mg/kg	8260B	01/26/12	1
Surrogate Recovery			3, 3			
Toluene-d8	106.		% Rec.	8260B	01/26/12	1
Dibromofluoromethane	109.		% Rec.	8260B	01/26/12	1
4-Bromofluorobenzene	96.4		% Rec.	8260B	01/26/12	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.038	mg/kg	8270C	01/25/12	1
Acenaphthene	BDL	0.038	mg/kg	8270C	01/25/12	1
Acenaphthylene	BDL	0.038	mg/kg	8270C	01/25/12	1
Benzo(a)anthracene	BDL	0.038	mg/kg	8270C	01/25/12	1
Benzo(a)pyrene	BDL	0.038	mg/kg	8270C	01/25/12	1
Benzo(b)fluoranthene	BDL	0.038	mg/kg	8270C	01/25/12	1
Benzo(g,h,i)perylene	BDL	0.038	mg/kg	8270C	01/25/12	1
Benzo(k)fluoranthene	BDL	0.038	mg/kg	8270C	01/25/12	1
Chrysene	BDL	0.038	mg/kg	8270C	01/25/12	1
Dibenz(a,h)anthracene	BDL	0.038	mg/kg	8270C	01/25/12	1

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:



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Tax I.D. 62-0814289

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-06

Project # : 896.01A

Est. 1970

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-B-3 6-8 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Fluoranthene	BDL	0.038	mg/kg	8270C	01/25/12	1
Fluorene	BDL	0.038	mg/kg	8270C	01/25/12	1
Indeno(1,2,3-cd)pyrene	BDL	0.038	mg/kg	8270C	01/25/12	1
Naphthalene	BDL	0.038	mg/kg	8270C	01/25/12	1
Phenanthrene	BDL	0.038	mg/kg	8270C	01/25/12	1
Pyrene	BDL	0.038	mg/kg	8270C	01/25/12	1
Surrogate Recovery						
Nitrobenzene-d5	83.7		% Rec.	8270C	01/25/12	1
2-Fluorobiphenyl	82.3		% Rec.	8270C	01/25/12	1
p-Terphenyl-d14	111.		% Rec.	8270C	01/25/12	1

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

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REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

ESC Sample # : L556915-07

January 31,2012

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

Site ID : : BR-SS-B-4 4-6 FT Sample ID Project # : 896.01A

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	85.		%	2540G	01/27/12	1
Mercury	0.58	0.024	mg/kg	7471	01/27/12	1
Arsenic	12.	1.2	mg/kg	6010B	01/25/12	1
Barium	64.	0.30	mg/kg	6010B	01/25/12	1
Cadmium	1.4	0.30	mg/kg	6010B	01/25/12	1
Chromium	20.	0.59	mg/kg	6010B	01/25/12	1
Lead	56.	0.30	mg/kg	6010B	01/26/12	1
Selenium	2.4	1.2	mg/kg	6010B	01/25/12	1
Silver	BDL	0.59	mg/kg	6010B	01/25/12	1

Results listed are dry weight basis.
BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

ESC Sample # : L556915-08

Project # : 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

Site ID : : BR-SS-MW-1 0-2 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	83.		%	2540G	01/27/12	1
Polychlorinated Biphenyls						
PCB 1016	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1221	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1232	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1242	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1248	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1254	BDL	0.020	mg/kg	8082	01/26/12	1
PCB 1260	BDL	0.020	mg/kg	8082	01/26/12	1
PCBs Surrogates						
Decachlorobiphenyl	83.9		% Rec.	8082	01/26/12	1
Tetrachloro-m-xylene	82.7		% Rec.	8082	01/26/12	1

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:



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Tax I.D. 62-0814289

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REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

Sample ID

January 31,2012

ESC Sample # : L556915-09

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-MW-1 2-4 FT

Site ID :

Project #: 896.01A

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	91.		%	2540G	01/27/12	1
Mercury	BDL	0.022	mg/kg	7471	01/27/12	1
Arsenic	9.1	1.1	mg/kg	6010B	01/25/12	1
Barium	41.	0.27	mg/kg	6010B	01/25/12	1
Cadmium	0.52	0.27	mg/kg	6010B	01/25/12	1
Chromium	13.	0.55	mg/kg	6010B	01/25/12	1
Lead	10.	0.27	mg/kg	6010B	01/26/12	1
Selenium	2.2	1.1	mg/kg	6010B	01/25/12	1
Silver	BDL	0.55	mg/kg	6010B	01/25/12	1

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL) Note:



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Tax I.D. 62-0814289

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-10

Project # : 896.01A

Est. 1970

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-MW-1 DUPLICATE 2-4 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	89.		%	2540G	01/27/12	1
Mercury	BDL	0.022	mg/kg	7471	01/27/12	1
Arsenic	11.	1.1	mg/kg	6010B	01/25/12	1
Barium	51.	0.28	mg/kg	6010B	01/25/12	1
Cadmium	0.46	0.28	mg/kg	6010B	01/25/12	1
Chromium	20.	0.56	mg/kg	6010B	01/25/12	1
Lead	15.	0.28	mg/kg	6010B	01/26/12	1
Selenium	3.1	1.1	mg/kg	6010B	01/25/12	1
Silver	BDL	0.56	mg/kg	6010B	01/25/12	1

Results listed are dry weight basis.
BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

ESC Sample # : L556915-11

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

Site ID : Sample ID : BR-SS-MW-1 10-12 FT

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	84.		%	2540G	01/27/12	1
TPH C6 - C12	71.	30.	mg/kg	8015	01/22/12	250
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	98.9		% Rec.	8015	01/22/12	250
Volatile Organics						
Acetone	BDL	15.	mg/kg	8260B	01/22/12	250
Acrylonitrile	BDL	3.0	mg/kg	8260B	01/22/12	250
Benzene	2.0	0.30	mg/kg	8260B	01/22/12	250
Bromobenzene	BDL	0.30	mg/kg	8260B	01/22/12	250
Bromodichloromethane	BDL	0.30	mg/kg	8260B	01/22/12	250
Bromoform	BDL	0.30	mg/kg	8260B	01/22/12	250
Bromomethane	BDL	1.5	mg/kg	8260B	01/22/12	250
n-Butylbenzene	0.54	0.30	mg/kg	8260B	01/22/12	250
sec-Butylbenzene	BDL	0.30	mg/kg	8260B	01/22/12	250
tert-Butylbenzene	BDL	0.30	mg/kg	8260B	01/22/12	250
Carbon tetrachloride	BDL	0.30	mg/kg	8260B	01/22/12	250
Chlorobenzene	BDL	0.30	mg/kg	8260B	01/22/12	250
Chlorodibromomethane	BDL	0.30	mg/kg	8260B	01/22/12	250
Chloroethane	BDL	1.5	mg/kg	8260B	01/22/12	250
2-Chloroethyl vinyl ether	BDL	15.	mg/kg	8260B	01/22/12	250
Chloroform	BDL	1.5	mg/kg	8260B	01/22/12	250
Chloromethane	BDL	0.74	mg/kg	8260B	01/22/12	250
2-Chlorotoluene	BDL	0.30	mg/kg	8260B	01/22/12	250
4-Chlorotoluene	BDL	0.30	mg/kg	8260B	01/22/12	250
1,2-Dibromo-3-Chloropropane	BDL	1.5	mg/kg	8260B	01/22/12	250
1,2-Dibromoethane	BDL	0.30	mg/kg	8260B	01/22/12	250
Dibromomethane	BDL	0.30	mg/kg	8260B	01/22/12	250
1,2-Dichlorobenzene	BDL	0.30	mg/kg	8260B	01/22/12	250
1,3-Dichlorobenzene	BDL	0.30	mg/kg	8260B	01/22/12	250
1,4-Dichlorobenzene	BDL	0.30	mg/kg	8260B	01/22/12	250
Dichlorodifluoromethane	BDL	1.5	mg/kg	8260B	01/22/12	250
1,1-Dichloroethane	BDL	0.30	mg/kg	8260B	01/22/12	250
1,2-Dichloroethane	BDL	0.30	mg/kg	8260B	01/22/12	250
1,1-Dichloroethene	BDL	0.30	mg/kg	8260B	01/22/12	250
cis-1,2-Dichloroethene	BDL	0.30	mg/kg	8260B	01/22/12	250
trans-1,2-Dichloroethene	BDL	0.30	mg/kg	8260B	01/22/12	250
1,2-Dichloropropane	BDL	0.30	mg/kg	8260B	01/22/12	250
1,1-Dichloropropene	BDL	0.30	mg/kg	8260B	01/22/12	250
1,3-Dichloropropane	BDL	0.30	mg/kg	8260B	01/22/12	250
cis-1,3-Dichloropropene	BDL	0.30	mg/kg	8260B	01/22/12	250
trans-1,3-Dichloropropene	BDL	0.30	mg/kg	8260B	01/22/12	250
2,2-Dichloropropane	BDL	0.30	mg/kg	8260B	01/22/12	250

Results listed are dry weight basis.
BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger
Partners Env. Consulting - Solon, O
31100 Solon Road, Ste. G

Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-11

Project # : 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

BR-SS-MW-1 10-12 FT Sample ID :

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Di-isopropyl ether	BDL	0.30	mg/kg	8260B	01/22/12	250
Ethylbenzene	3.7	0.30	mg/kg	8260B	01/22/12	250
Hexachloro-1,3-butadiene	BDL	0.30	mg/kg	8260B	01/22/12	250
n-Hexane	BDL	3.0	mg/kg	8260B	01/22/12	250
Isopropylbenzene	0.75	0.30	mg/kg	8260B	01/22/12	250
p-Isopropyltoluene	BDL	0.30	mg/kg	8260B	01/22/12	250
2-Butanone (MEK)	BDL	3.0	mg/kg	8260B	01/22/12	250
Methylene Chloride	BDL	1.5	mg/kg	8260B	01/22/12	250
4-Methyl-2-pentanone (MIBK)	BDL	3.0	mg/kg	8260B	01/22/12	250
Methyl tert-butyl ether	BDL	0.30	mg/kg	8260B	01/22/12	250
Naphthalene	3.0	1.5	mg/kg	8260B	01/22/12	250
n-Propylbenzene	2.6	0.30	mg/kg	8260B	01/22/12	250
Styrene	BDL	0.30	mg/kg	8260B	01/22/12	250
1,1,1,2-Tetrachloroethane	BDL	0.30	mg/kg	8260B	01/22/12	250
1,1,2,2-Tetrachloroethane	BDL	0.30	mg/kg	8260B	01/22/12	250
Tetrachloroethene	BDL	0.30	mg/kg	8260B	01/22/12	250
Toluene	BDL	1.5	mg/kg	8260B	01/22/12	250
1,2,3-Trichlorobenzene	BDL	0.30	mg/kg	8260B	01/22/12	250
1,2,4-Trichlorobenzene	BDL	0.30	mg/kg	8260B	01/22/12	250
1,1,1-Trichloroethane	BDL	0.30	mg/kg	8260B	01/22/12	250
1,1,2-Trichloroethane	BDL	0.30	mg/kg	8260B	01/22/12	250
Trichloroethene	BDL	0.30	mg/kg	8260B	01/22/12	250
Trichlorofluoromethane	BDL	1.5	mg/kg	8260B	01/22/12	250
1,2,3-Trichloropropane	BDL	0.74	mg/kg	8260B	01/22/12	250
1,2,4-Trimethylbenzene	7.1	0.30	mg/kg	8260B	01/22/12	250
1,3,5-Trimethylbenzene	0.71	0.30	mg/kg	8260B	01/22/12	250
Vinyl chloride	BDL	0.30	mg/kg	8260B	01/22/12	250
Xylenes, Total	1.0	0.89	mg/kg	8260B	01/22/12	250
Surrogate Recovery	1.0	0.03	9/119	02002	01/22/12	250
Toluene-d8	100.		% Rec.	8260B	01/22/12	250
Dibromofluoromethane	97.6		% Rec.	8260B	01/22/12	250
4-Bromofluorobenzene	103.		% Rec.	8260B	01/22/12	250
1 BIOMOTIUOI ODCIIZCIIC	103.		· ncc.	0200D	01/22/12	250
Ohio DRO						
C10-C20 Hydrocarbons	81.	4.7	mg/kg	8015M	01/25/12	1
C20-C34 Hydrocarbons	7.4	4.7	mg/kg	8015M	01/25/12	1
Surrogate Recovery						
o-Terphenyl	74.7		% Rec.	8015M	01/25/12	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.039	mg/kg	8270C	01/25/12	1
Acenaphthene	BDL	0.039	mg/kg	8270C	01/25/12	1
Acenaphthylene	BDL	0.039	mg/kg	8270C	01/25/12	1
Benzo(a)anthracene	BDL	0.039	mg/kg	8270C 8270C	01/25/12	1
Delizo ( a ) allelle acelle	חתם	0.039	ilig/kg	04/00	01/25/12	1

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:



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Tax I.D. 62-0814289

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REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-11

Project # : 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-MW-1 10-12 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.039	mg/kg	8270C	01/25/12	1
Benzo(b)fluoranthene	BDL	0.039	mg/kg	8270C	01/25/12	1
Benzo(g,h,i)perylene	BDL	0.039	mg/kg	8270C	01/25/12	1
Benzo(k)fluoranthene	BDL	0.039	mg/kg	8270C	01/25/12	1
Chrysene	BDL	0.039	mg/kg	8270C	01/25/12	1
Dibenz(a,h)anthracene	BDL	0.039	mg/kg	8270C	01/25/12	1
Fluoranthene	BDL	0.039	mg/kg	8270C	01/25/12	1
Fluorene	BDL	0.039	mg/kg	8270C	01/25/12	1
Indeno(1,2,3-cd)pyrene	BDL	0.039	mg/kg	8270C	01/25/12	1
Naphthalene	2.3	0.39	mg/kg	8270C	01/26/12	10
Phenanthrene	0.047	0.039	mg/kg	8270C	01/25/12	1
Pyrene	BDL	0.039	mg/kg	8270C	01/25/12	1
Surrogate Recovery						
Nitrobenzene-d5	84.1		% Rec.	8270C	01/25/12	1
2-Fluorobiphenyl	69.7		% Rec.	8270C	01/25/12	1
p-Terphenyl-d14	101.		% Rec.	8270C	01/25/12	1

Results listed are dry weight basis.
BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:



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Tax I.D. 62-0814289

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REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-12

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

BR-SS-MW-2 4-6 FT Sample ID :

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	89.		%	2540G	01/27/12	1
Volatile Organics						
Acetone	BDL	0.056	mq/kq	8260B	01/22/12	1
Acrylonitrile	BDL	0.011	mg/kg	8260B	01/22/12	1
Benzene	0.0011	0.0011	mg/kg	8260B	01/22/12	1
Bromobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Bromodichloromethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
Bromoform	BDL	0.0011	mg/kg	8260B	01/22/12	1
Bromomethane	BDL	0.0056	mg/kg	8260B	01/22/12	1
n-Butylbenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
sec-Butylbenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
tert-Butylbenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Carbon tetrachloride	BDL	0.0011	mg/kg	8260B	01/22/12	1
Chlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Chlorodibromomethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
Chloroethane	BDL	0.0056	mg/kg	8260B	01/22/12	1
2-Chloroethyl vinyl ether	BDL	0.056	mg/kg	8260B	01/22/12	1
Chloroform	BDL	0.0056	mg/kg	8260B	01/22/12	1
Chloromethane	BDL	0.0028	mg/kg	8260B	01/22/12	1
2-Chlorotoluene	BDL	0.0011	mg/kg	8260B	01/22/12	1
4-Chlorotoluene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,2-Dibromo-3-Chloropropane	BDL	0.0056	mg/kg	8260B	01/22/12	1
1,2-Dibromoethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
Dibromomethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,2-Dichlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,3-Dichlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,4-Dichlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Dichlorodifluoromethane	BDL	0.0056	mg/kg	8260B	01/22/12	1
1,1-Dichloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,2-Dichloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1-Dichloroethene	BDL	0.0011	mg/kg	8260B	01/22/12	1
cis-1,2-Dichloroethene	BDL	0.0011	mg/kg	8260B	01/22/12	1
trans-1,2-Dichloroethene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,2-Dichloropropane	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1-Dichloropropene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,3-Dichloropropane	BDL	0.0011	mg/kg	8260B	01/22/12	1
cis-1,3-Dichloropropene	BDL	0.0011	mg/kg	8260B	01/22/12	1
trans-1,3-Dichloropropene	BDL	0.0011	mg/kg	8260B	01/22/12	1
2,2-Dichloropropane	BDL	0.0011	mg/kg	8260B	01/22/12	1
Di-isopropyl ether	BDL	0.0011	mg/kg	8260B	01/22/12	1
Ethylbenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Hexachloro-1,3-butadiene	BDL	0.0011	mg/kg	8260B	01/22/12	1
n-Hexane	BDL	0.011	mg/kg	8260B	01/22/12	1
			5. 5		- , , ,	

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

Project #: 896.01A

January 31,2012

ESC Sample # : L556915-12

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

Site ID : : BR-SS-MW-2 4-6 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Isopropylbenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
p-Isopropyltoluene	BDL	0.0011	mg/kg	8260B	01/22/12	1
2-Butanone (MEK)	BDL	0.011	mg/kg	8260B	01/22/12	1
Methylene Chloride	BDL	0.0056	mg/kg	8260B	01/22/12	1
4-Methyl-2-pentanone (MIBK)	BDL	0.011	mg/kg	8260B	01/22/12	1
Methyl tert-butyl ether	BDL	0.0011	mg/kg	8260B	01/22/12	1
Naphthalene	BDL	0.0056	mg/kg	8260B	01/22/12	1
n-Propylbenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Styrene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1,1,2-Tetrachloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1,2,2-Tetrachloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
Tetrachloroethene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Toluene	BDL	0.0056	mg/kg	8260B	01/22/12	1
1,2,3-Trichlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,2,4-Trichlorobenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1,1-Trichloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,1,2-Trichloroethane	BDL	0.0011	mg/kg	8260B	01/22/12	1
Trichloroethene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Trichlorofluoromethane	BDL	0.0056	mg/kg	8260B	01/22/12	1
1,2,3-Trichloropropane	BDL	0.0028	mg/kg	8260B	01/22/12	1
1,2,4-Trimethylbenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
1,3,5-Trimethylbenzene	BDL	0.0011	mg/kg	8260B	01/22/12	1
Vinyl chloride	BDL	0.0011	mg/kg	8260B	01/22/12	ī
Xylenes, Total	BDL	0.0034	mg/kg	8260B	01/22/12	1
Surrogate Recovery			5, 5		. , ,	
Toluene-d8	99.2		% Rec.	8260B	01/22/12	1
Dibromofluoromethane	102.		% Rec.	8260B	01/22/12	1
4-Bromofluorobenzene	96.1		% Rec.	8260B	01/22/12	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.037	mg/kg	8270C	01/25/12	1
Acenaphthene	BDL	0.037	mg/kg	8270C	01/25/12	1
Acenaphthylene	BDL	0.037	mg/kg	8270C	01/25/12	1
Benzo(a)anthracene	BDL	0.037	mg/kg	8270C	01/25/12	1
Benzo(a)pyrene	BDL	0.037	mg/kg	8270C	01/25/12	1
Benzo(b)fluoranthene	BDL	0.037	mg/kg	8270C	01/25/12	1
Benzo(g,h,i)perylene	BDL	0.037	mg/kg	8270C	01/25/12	1
Benzo(k)fluoranthene	BDL	0.037	mg/kg	8270C	01/25/12	1
Chrysene	BDL	0.037	mg/kg	8270C	01/25/12	1
Dibenz(a,h)anthracene	BDL	0.037	mg/kg	8270C	01/25/12	1
Fluoranthene	BDL	0.037	mg/kg	8270C	01/25/12	1
Fluorene	BDL	0.037	mg/kg	8270C	01/25/12	1
Indeno(1,2,3-cd)pyrene	BDL	0.037	mg/kg	8270C	01/25/12	1
Naphthalene	BDL	0.037	mg/kg	8270C	01/25/12	1

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL) Note:



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

ESC Sample # : L556915-12

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

Site ID : : BR-SS-MW-2 4-6 FT Sample ID Project # : 896.01A

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Phenanthrene Pyrene	BDL BDL	0.037 0.037	mg/kg mg/ka	8270C 8270C	01/25/12 01/25/12	1 1
Surrogate Recovery			5,5		,,	_
Nitrobenzene-d5	74.6		% Rec.	8270C	01/25/12	1
2-Fluorobiphenyl	78.4		% Rec.	8270C	01/25/12	1
p-Terphenyl-d14	108.		% Rec.	8270C	01/25/12	1

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Est. 1970

ESC Sample # : L556915-13

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

Site ID : : BR-SS-MW-2 10-12 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	84.		%	2540G	01/27/12	1
TPH C6 - C12	0.72	0.12	mg/kg	8015	01/22/12	1
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	94.4		% Rec.	8015	01/22/12	1

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

REPORT OF ANALYSIS

Al Brillinger
Partners Env. Consulting - Solon, O
31100 Solon Road, Ste. G

Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-14

Project # : 896.01A

Est. 1970

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-MW-3 10-12 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	81.		%	2540G	01/27/12	1
TPH C6 - C12	200	120	mg/kg	8015	01/22/12	1000
Surrogate Recovery-%			5, 5			
a,a,a-Trifluorotoluene(FID)	99.7		% Rec.	8015	01/22/12	1000
Volatile Organics						
Acetone	BDL	6.2	mg/kg	8260B	01/26/12	100
Acrylonitrile	BDL	1.2	mg/kg	8260B	01/26/12	100
Benzene	BDL	0.12	mg/kg	8260B	01/26/12	100
Bromobenzene	BDL	0.12	mg/kg	8260B	01/26/12	100
Bromodichloromethane	BDL	0.12	mg/kg	8260B	01/26/12	100
Bromoform	BDL	0.12	mg/kg	8260B	01/26/12	100
Bromomethane	BDL	0.62	mg/kg	8260B	01/26/12	100
n-Butylbenzene	1.4	0.12	mg/kg	8260B	01/26/12	100
sec-Butylbenzene	0.54	0.12	mg/kg	8260B	01/26/12	100
tert-Butylbenzene	BDL	0.12	mg/kg	8260B	01/26/12	100
Carbon tetrachloride	BDL	0.12	mg/kg	8260B	01/26/12	100
Chlorobenzene	BDL	0.12	mg/kg	8260B	01/26/12	100
Chlorodibromomethane	BDL	0.12	mg/kg	8260B	01/26/12	100
Chloroethane	BDL	0.62	mg/kg	8260B	01/26/12	100
2-Chloroethyl vinyl ether	BDL	6.2	mg/kg	8260B	01/26/12	100
Chloroform	BDL	0.62	mg/kg	8260B	01/26/12	100
Chloromethane	BDL	0.31	mg/kg	8260B	01/26/12	100
2-Chlorotoluene	BDL	0.12	mg/kg	8260B	01/26/12	100
4-Chlorotoluene	BDL	0.12	mg/kg	8260B	01/26/12	100
1,2-Dibromo-3-Chloropropane	BDL	0.62	mg/kg	8260B	01/26/12	100
1,2-Dibromoethane	BDL	0.12	mg/kg	8260B	01/26/12	100
Dibromomethane	BDL	0.12	mg/kg	8260B	01/26/12	100
1,2-Dichlorobenzene	BDL	0.12	mg/kg	8260B	01/26/12	100
1,3-Dichlorobenzene	BDL	0.12	mg/kg	8260B	01/26/12	100
1,4-Dichlorobenzene	BDL	0.12	mg/kg	8260B	01/26/12	100
Dichlorodifluoromethane	BDL	0.62	mg/kg	8260B	01/26/12	100
1,1-Dichloroethane	BDL	0.12	mg/kg	8260B	01/26/12	100
1,2-Dichloroethane	BDL	0.12	mg/kg	8260B	01/26/12	100
1,1-Dichloroethene	BDL	0.12	mg/kg	8260B	01/26/12	100
cis-1,2-Dichloroethene	BDL	0.12	mg/kg	8260B	01/26/12	100
trans-1,2-Dichloroethene	BDL	0.12	mg/kg	8260B	01/26/12	100
1,2-Dichloropropane	BDL	0.12	mg/kg	8260B	01/26/12	100
1,1-Dichloropropene	BDL	0.12	mg/kg	8260B	01/26/12	100
1,3-Dichloropropane	BDL	0.12	mg/kg	8260B	01/26/12	100
cis-1,3-Dichloropropene	BDL	0.12	mg/kg	8260B	01/26/12	100
trans-1,3-Dichloropropene	BDL	0.12	mg/kg	8260B	01/26/12	100
2,2-Dichloropropane	BDL	0.12	mg/kg	8260B	01/26/12	100
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Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Tax I.D. 62-0814289

Est. 1970

January 31,2012

Site ID :

REPORT OF ANALYSIS

Al Brillinger
Partners Env. Consulting - Solon, O
31100 Solon Road, Ste. G

Solon, OH 44139

ESC Sample # : L556915-14

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

BR-SS-MW-3 10-12 FT Sample ID :

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Di-isopropyl ether	BDL	0.12	mg/kg	8260B	01/26/12	100
Ethylbenzene	1.8	0.12	mg/kg	8260B	01/26/12	100
Hexachloro-1,3-butadiene	BDL	0.12	mg/kg	8260B	01/26/12	100
n-Hexane	BDL	1.2	mg/kg	8260B	01/26/12	100
Isopropylbenzene	0.64	0.12	mg/kg	8260B	01/26/12	100
p-Isopropyltoluene	0.22	0.12	mg/kg	8260B	01/26/12	100
2-Butanone (MEK)	BDL	1.2	mg/kg	8260B	01/26/12	100
Methylene Chloride	BDL	0.62	mg/kg	8260B	01/26/12	100
4-Methyl-2-pentanone (MIBK)	BDL	1.2	mg/kg	8260B	01/26/12	100
Methyl tert-butyl ether	BDL	0.12	mg/kg	8260B	01/26/12	100
Naphthalene	6.3	0.62	mg/kg	8260B	01/26/12	100
n-Propylbenzene	3.1	0.12	mg/kg	8260B	01/26/12	100
Styrene	BDL	0.12	mg/kg	8260B	01/26/12	100
1,1,1,2-Tetrachloroethane	BDL	0.12	mg/kg	8260B	01/26/12	100
1,1,2,2-Tetrachloroethane	BDL	0.12	mg/kg	8260B	01/26/12	100
Tetrachloroethene	BDL	0.12	mg/kg	8260B	01/26/12	100
Toluene	BDL	0.62	mg/kg	8260B	01/26/12	100
1,2,3-Trichlorobenzene	BDL	0.12	mg/kg	8260B	01/26/12	100
1,2,4-Trichlorobenzene	BDL	0.12	mg/kg	8260B	01/26/12	100
1,1,1-Trichloroethane	BDL	0.12	mg/kg	8260B	01/26/12	100
1,1,2-Trichloroethane	BDL	0.12	mg/kg	8260B	01/26/12	100
Trichloroethene	BDL	0.12	mg/kg	8260B	01/26/12	100
Trichlorofluoromethane	BDL	0.12	mg/kg	8260B	01/26/12	100
1,2,3-Trichloropropane	BDL	0.31	mg/kg	8260B	01/26/12	100
1,2,4-Trimethylbenzene	10.	0.12	mg/kg	8260B	01/26/12	100
1,3,5-Trimethylbenzene	1.8	0.12	mg/kg	8260B	01/26/12	100
Vinyl chloride	BDL	0.12		8260B	01/26/12	100
Xylenes, Total	1.5	0.12	mg/kg	8260B	01/26/12	100
	1.5	0.37	mg/kg	020UB	01/26/12	100
Surrogate Recovery Toluene-d8	103.		% Rec.	8260B	01/26/12	100
				8260B 8260B	01/26/12	
Dibromofluoromethane 4-Bromofluorobenzene	110. 91.8		% Rec.	8260B 8260B		100
4-Bromoiluoropenzene	91.8		% Rec.	826UB	01/26/12	100
Ohio DRO						
C10-C20 Hydrocarbons	17.	4.9	mg/kg	8015M	01/25/12	1
C20-C34 Hydrocarbons	BDL	4.9	mg/kg	8015M	01/25/12	1
Surrogate Recovery			3. 3			
o-Terphenyl	72.3		% Rec.	8015M	01/25/12	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.056	0.041	mg/kg	8270C	01/25/12	1
Acenaphthene	0.14	0.041	mg/kg	8270C	01/25/12	1
Acenaphthylene	BDL	0.041	mg/kg	8270C	01/25/12	1
Benzo(a)anthracene	0.096	0.041	mg/kg	8270C	01/25/12	1
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Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL) Note:



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31,2012

Site ID :

ESC Sample # : L556915-14

Project # : 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-MW-3 10-12 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.093	0.041	mg/kg	8270C	01/25/12	1
Benzo(b)fluoranthene	0.11	0.041	mg/kg	8270C	01/25/12	1
Benzo(g,h,i)perylene	0.048	0.041	mg/kg	8270C	01/25/12	1
Benzo(k)fluoranthene	BDL	0.041	mg/kg	8270C	01/25/12	1
Chrysene	0.080	0.041	mg/kg	8270C	01/25/12	1
Dibenz(a,h)anthracene	BDL	0.041	mg/kg	8270C	01/25/12	1
Fluoranthene	0.14	0.041	mg/kg	8270C	01/25/12	1
Fluorene	0.15	0.041	mg/kg	8270C	01/25/12	1
Indeno(1,2,3-cd)pyrene	0.046	0.041	mg/kg	8270C	01/25/12	1
Naphthalene	0.31	0.041	mg/kg	8270C	01/25/12	1
Phenanthrene	0.14	0.041	mg/kg	8270C	01/25/12	1
Pyrene	0.12	0.041	mg/kg	8270C	01/25/12	1
Surrogate Recovery			3. 3			
Nitrobenzene-d5	78.9		% Rec.	8270C	01/25/12	1
2-Fluorobiphenyl	68.1		% Rec.	8270C	01/25/12	1
p-Terphenyl-d14	101.		% Rec.	8270C	01/25/12	1

Results listed are dry weight basis.
BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

Project #: 896.01A

January 31, 2012

Site ID :

ESC Sample # : L556915-15

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-MW-1 DUPLICATE 10-12 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	89.		%	2540G	01/27/12	1
Volatile Organics						
Acetone	BDL	5.6	mg/kg	8260B	01/26/12	100
Acrylonitrile	BDL	1.1	mg/kg	8260B	01/26/12	100
Benzene	2.3	0.11	mg/kg	8260B	01/26/12	100
Bromobenzene	BDL	0.11	mg/kg	8260B	01/26/12	100
Bromodichloromethane	BDL	0.11	mg/kg	8260B	01/26/12	100
Bromoform	BDL	0.11	mg/kg	8260B	01/26/12	100
Bromomethane	BDL	0.56	mg/kg	8260B	01/26/12	100
n-Butylbenzene	1.2	0.11	mg/kg	8260B	01/26/12	100
sec-Butylbenzene	0.45	0.11	mg/kg	8260B	01/26/12	100
tert-Butylbenzene	BDL	0.11	mg/kg	8260B	01/26/12	100
Carbon tetrachloride	BDL	0.11	mg/kg	8260B	01/26/12	100
Chlorobenzene	BDL	0.11	mg/kg	8260B	01/26/12	100
Chlorodibromomethane	BDL	0.11	mg/kg	8260B	01/26/12	100
Chloroethane	BDL	0.56	mg/kg	8260B	01/26/12	100
2-Chloroethyl vinyl ether	BDL	5.6	mg/kg	8260B	01/26/12	100
Chloroform	BDL	0.56	mg/kg	8260B	01/26/12	100
Chloromethane	BDL	0.28	mg/kg	8260B	01/26/12	100
2-Chlorotoluene	BDL	0.11	mg/kg	8260B	01/26/12	100
4-Chlorotoluene	BDL	0.11	mg/kg	8260B	01/26/12	100
1,2-Dibromo-3-Chloropropane	BDL	0.56	mg/kg	8260B	01/26/12	100
1,2-Dibromoethane	BDL	0.11	mg/kg	8260B	01/26/12	100
Dibromomethane	BDL	0.11	mg/kg	8260B	01/26/12	100
1,2-Dichlorobenzene	BDL	0.11	mg/kg	8260B	01/26/12	100
1,3-Dichlorobenzene	BDL	0.11	mg/kg	8260B	01/26/12	100
1,4-Dichlorobenzene	BDL	0.11	mg/kg	8260B	01/26/12	100
Dichlorodifluoromethane	BDL	0.56	mg/kg	8260B	01/26/12	100
1,1-Dichloroethane	BDL	0.11	mg/kg	8260B	01/26/12	100
1,2-Dichloroethane	BDL	0.11	mg/kg	8260B	01/26/12	100
1,1-Dichloroethene	BDL	0.11	mg/kg	8260B	01/26/12	100
cis-1,2-Dichloroethene	BDL	0.11	mg/kg	8260B	01/26/12	100
trans-1,2-Dichloroethene	BDL	0.11	mg/kg	8260B	01/26/12	100
1,2-Dichloropropane	BDL	0.11	mg/kg	8260B	01/26/12	100
1,1-Dichloropropene	BDL	0.11	mg/kg	8260B	01/26/12	100
1,3-Dichloropropane	BDL	0.11	mg/kg	8260B	01/26/12	100
cis-1,3-Dichloropropene	BDL	0.11	mg/kg	8260B	01/26/12	100
trans-1,3-Dichloropropene	BDL	0.11	mg/kg	8260B	01/26/12	100
2,2-Dichloropropane	BDL	0.11	mg/kg	8260B	01/26/12	100
Di-isopropyl ether	BDL	0.11	mg/kg	8260B	01/26/12	100
Ethylbenzene	7.3	0.11	mg/kg	8260B	01/26/12	100
Hexachloro-1,3-butadiene	BDL	0.11	mg/kg	8260B	01/26/12	100
n-Hexane	BDL	1.1	mg/kg	8260B	01/26/12	100

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL) Note:



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31, 2012

Site ID :

ESC Sample # : L556915-15

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-MW-1 DUPLICATE 10-12 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Isopropylbenzene	0.95	0.11	mg/kg	8260B	01/26/12	100
p-Isopropyltoluene	BDL	0.11	mg/kg	8260B	01/26/12	100
2-Butanone (MEK)	BDL	1.1	mg/kg	8260B	01/26/12	100
Methylene Chloride	BDL	0.56	mg/kg	8260B	01/26/12	100
4-Methyl-2-pentanone (MIBK)	BDL	1.1	mg/kg	8260B	01/26/12	100
Methyl tert-butyl ether	BDL	0.11	mg/kg	8260B	01/26/12	100
Naphthalene	7.3	0.56	mg/kg	8260B	01/26/12	100
n-Propylbenzene	3.7	0.11	mg/kg	8260B	01/26/12	100
Styrene	BDL	0.11	mg/kg	8260B	01/26/12	100
1,1,1,2-Tetrachloroethane	BDL	0.11	mg/kg	8260B	01/26/12	100
1,1,2,2-Tetrachloroethane	BDL	0.11	mg/kg	8260B	01/26/12	100
Tetrachloroethene	BDL	0.11	mg/kg	8260B	01/26/12	100
Toluene	BDL	0.56	mg/kg	8260B	01/26/12	100
1,2,3-Trichlorobenzene	BDL	0.11	mg/kg	8260B	01/26/12	100
1,2,4-Trichlorobenzene	BDL	0.11	mg/kg	8260B	01/26/12	100
1,1,1-Trichloroethane	BDL	0.11	mg/kg	8260B	01/26/12	100
1,1,2-Trichloroethane	BDL	0.11	mg/kg	8260B	01/26/12	100
Trichloroethene	BDL	0.11	mg/kg	8260B	01/26/12	100
Trichlorofluoromethane	BDL	0.56	mg/kg	8260B	01/26/12	100
1,2,3-Trichloropropane	BDL	0.28	mg/kg	8260B	01/26/12	100
1,2,4-Trimethylbenzene	44.	0.56	mq/kq	8260B	01/27/12	500
1,3,5-Trimethylbenzene	3.4	0.11	mg/kg	8260B	01/26/12	100
Vinyl chloride	BDL	0.11	mg/kg	8260B	01/26/12	100
Xylenes, Total	4.3	0.34	mg/kg	8260B	01/26/12	100
Surrogate Recovery	1.5	0.51	1119/119	OZOOD	01/20/12	100
Toluene-d8	104.		% Rec.	8260B	01/26/12	100
Dibromofluoromethane	108.		% Rec.	8260B	01/26/12	100
4-Bromofluorobenzene	80.5		% Rec.	8260B	01/26/12	100
Polynuclear Aromatic Hydrocarbons						_
Anthracene	BDL	0.037	mg/kg	8270C	01/25/12	1
Acenaphthene	BDL	0.037	mg/kg	8270C	01/25/12	1
Acenaphthylene	BDL	0.037	mg/kg	8270C	01/25/12	1
Benzo(a)anthracene	BDL	0.037	mg/kg	8270C	01/25/12	1
Benzo(a)pyrene	BDL	0.037	mg/kg	8270C	01/25/12	1
Benzo(b)fluoranthene	BDL	0.037	mg/kg	8270C	01/25/12	1
Benzo(g,h,i)perylene	BDL	0.037	mg/kg	8270C	01/25/12	1
Benzo(k)fluoranthene	BDL	0.037	mg/kg	8270C	01/25/12	1
Chrysene	BDL	0.037	mg/kg	8270C	01/25/12	1
Dibenz(a,h)anthracene	BDL	0.037	mg/kg	8270C	01/25/12	1
Fluoranthene	BDL	0.037	mg/kg	8270C	01/25/12	1
Fluorene	BDL	0.037	mg/kg	8270C	01/25/12	1
Indeno(1,2,3-cd)pyrene	BDL	0.037	mg/kg	8270C	01/25/12	1
Naphthalene	2.5	0.37	mg/kg	8270C	01/26/12	10

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL) Note:



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

January 31, 2012

Site ID :

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

ESC Sample # : L556915-15

Project # : 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

: BR-SS-MW-1 DUPLICATE 10-12 FT Sample ID

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Phenanthrene Pyrene	0.062 BDL	0.037 0.037	mg/kg mg/kg	8270C 8270C	01/25/12 01/25/12	1 1
Surrogate Recovery Nitrobenzene-d5 2-Fluorobiphenyl	84.8 71.8		% Rec. % Rec.	8270C 8270C	01/25/12 01/25/12	1 1
p-Terphenyl-d14	99.8		% Rec.	8270C	01/25/12	1

Results listed are dry weight basis. BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

896.01A

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G

Solon, OH 44139

January 31, 2012

Site ID :

Project # :

ESC Sample # : L556915-16

Date Received 21, 2012 January

Description : CCLRC-Buckeye Road

Sample ID : EOP BLANK

Collected By Tom Weir Collection Date : 01/19/12 00:00

Parameter Result Det. Limit Units Method Date Dil. 01/26/12 Mercury BDL 0.00020 mq/17470A 1 Arsenic BDL 0.020 mg/16010B 01/24/12 1 0.0050 01/24/12 Barium BDL mg/16010B 1 Cadmium BDL 0.0050 mg/16010B 01/24/12 1 Chromium BDL 0.010 mg/16010B 01/24/12 1 Lead BDL 0.0050 mg/16010B 01/24/12 1 Selenium BDT. 0.020 mg/16010B 01/24/12 1 01/24/12 0.010 1 Silver BDL mq/16010B Volatile Organics Acetone BDL 0.050 mg/18260B 01/25/12 1 Acrolein BDL 0.050 mg/18260B 01/21/12 1 Acrylonitrile BDL 0.010 mg/18260B 01/21/12 1 Benzene BDL 0.0010 mg/18260B 01/21/12 1 Bromobenzene BDL 0.0010 mg/18260B 01/21/12 1 01/21/12 0.0043 0.0010 mg/18260B Bromodichloromethane 1 mg/101/21/12 8260B BDL 0.0010 1 Bromoform 01/21/12 Bromomethane BDL 0.0050 mg/18260B 0.0010 mg/18260B 01/21/12 n-Butylbenzene BDL mg/1sec-Butylbenzene BDL 0.0010 8260B 01/21/12 1 tert-Butylbenzene BDL 0.0010 mg/18260B 01/21/12 1 01/21/12 01/21/12 Carbon tetrachloride BDT. 0.0010 mg/18260B 1 0.0010 mg/1Chlorobenzene BDL 8260B 1 01/21/12 Chlorodibromomethane mg/10.0011 0.0010 8260B 1 01/21/12 Chloroethane BDL 0.0050 mg/18260B 0.050 01/21/12 2-Chloroethyl vinyl ether BDL mg/18260B Chloroform 0.018 0.0050 mg/18260B 01/21/12 1 Chloromethane BDL 0.0025 mg/18260B 01/21/12 2-Chlorotoluene BDL 0.0010 mg/18260B 01/21/12 1 0.0010 4-Chlorotoluene 01/21/12 01/21/12 BDT. mg/18260B 1 1,2-Dibromo-3-Chloropropane 8260B mg/1BDL 0.0050 1 1,2-Dibromoethane 0.0010 mg/101/21/12 BDL 8260B 1 0.0010 mg/101/21/12 Dibromomethane BDL 8260B 1,2-Dichlorobenzene BDL 0.0010 mg/18260B 01/21/12 1,3-Dichlorobenzene BDL 0.0010 mg/18260B 01/21/12 ,4-Dichlorobenzene BDL 0.0010 mg/18260B 01/21/12 1 Dichlorodifluoromethane BDL 0.0050 mg/18260B 01/21/12 1 1,1-Dichloroethane BDT. 0.0010 mg/18260B 01/21/12 1 0.0010 mg/101/21/12 1.2-Dichloroethane BDL 8260B 1 1,1-Dichloroethene mq/18260B 01/21/12 BDL 0.0010 1 01/21/12 1 cis-1,2-Dichloroethene BDL 0.0010 mg/18260B trans-1,2-Dichloroethene 0.0010 mg/101/21/12 8260B

0.0010

BDL

BDL - Below Detection Limit

1,2-Dichloropropane

Det. Limit - Practical Quantitation Limit(PQL)

01/21/12

1

8260B

mq/1



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31, 2012

Site ID :

ESC Sample # : L556915-16

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

Sample ID : EQP BLANK

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Project #: 896.01A

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
1,1-Dichloropropene	BDL	0.0010	mg/l	8260B	01/21/12	1
1,3-Dichloropropane	BDL	0.0010	mg/l	8260B	01/21/12	1
cis-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	01/21/12	ī
trans-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	01/21/12	1
2,2-Dichloropropane	BDL	0.0010	mg/l	8260B	01/21/12	ī
Di-isopropyl ether	BDL	0.0010	mg/l	8260B	01/21/12	1
Ethylbenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
Hexachloro-1,3-butadiene	BDL	0.0010	mg/l	8260B	01/21/12	1
n-Hexane	BDL	0.010	mg/1	8260B	01/21/12	1
Isopropylbenzene	BDL	0.010	mg/l	8260B	01/21/12	1
p-Isopropyltoluene	BDL	0.0010	mg/1	8260B	01/21/12	1
2-Butanone (MEK)	BDL	0.010	mg/1	8260B	01/21/12	1
Methylene Chloride	BDL	0.010	mg/1	8260B	01/25/12	1
						1
4-Methyl-2-pentanone (MIBK)	BDL	0.010	mg/1	8260B 8260B	01/21/12 01/21/12	1
Methyl tert-butyl ether	BDL	0.0010	mg/1			_
Naphthalene	BDL	0.0050	mg/1	8260B	01/21/12	1
n-Propylbenzene	BDL	0.0010	mg/l	8260B	01/21/12	1
Styrene	BDL	0.0010	mg/l	8260B	01/21/12	1
1,1,1,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	01/21/12	1
1,1,2,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	01/21/12	1
Tetrachloroethene	BDL	0.0010	mg/1	8260B	01/21/12	1
Toluene	BDL	0.0050	mg/1	8260B	01/21/12	1
1,2,3-Trichlorobenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
1,2,4-Trichlorobenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
1,1,1-Trichloroethane	BDL	0.0010	mg/1	8260B	01/21/12	1
1,1,2-Trichloroethane	BDL	0.0010	mg/1	8260B	01/21/12	1
Trichloroethene	BDL	0.0010	mg/1	8260B	01/21/12	1
Trichlorofluoromethane	BDL	0.0050	mg/1	8260B	01/21/12	1
1,2,3-Trichloropropane	BDL	0.0025	mg/1	8260B	01/21/12	1
1,2,4-Trimethylbenzene	BDL	0.0010	mg/l	8260B	01/21/12	1
1,3,5-Trimethylbenzene	BDL	0.0010	mg/l	8260B	01/21/12	1
Vinyl chloride	BDL	0.0010	mg/l	8260B	01/21/12	1
Xylenes, Total	BDL	0.0030	mg/l	8260B	01/21/12	1
Surrogate Recovery			-			
Toluene-d8	102.		% Rec.	8260B	01/21/12	1
Dibromofluoromethane	99.5		% Rec.	8260B	01/21/12	1
4-Bromofluorobenzene	107.		% Rec.	8260B	01/21/12	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.000050	mg/1	8270C-SIM	01/24/12	1
Acenaphthene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
Acenaphthylene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
Benzo(a)anthracene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
Benzo(a)pyrene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	ī
		0.00000			01,21,12	_

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31, 2012

Site ID :

ESC Sample # : L556915-16

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

Description

Sample ID : EQP BLANK

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(b)fluoranthene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
Benzo(g,h,i)perylene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
Benzo(k)fluoranthene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	_ 1
Chrysene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
Dibenz(a,h)anthracene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
Fluoranthene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
Fluorene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
Indeno(1,2,3-cd)pyrene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
Naphthalene	BDL	0.00025	mg/l	8270C-SIM	01/24/12	1
Phenanthrene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
Pyrene	BDL	0.000050	mg/l	8270C-SIM	01/24/12	1
1-Methylnaphthalene	BDL	0.00025	mg/l	8270C-SIM	01/24/12	1
2-Methylnaphthalene	BDL	0.00025	mg/l	8270C-SIM	01/24/12	1
2-Chloronaphthalene	BDL	0.00025	mg/l	8270C-SIM	01/24/12	1
Surrogate Recovery			3.			
Nitrobenzene-d5	103.		% Rec.	8270C-SIM	01/24/12	1
2-Fluorobiphenyl	94.3		% Rec.	8270C-SIM	01/24/12	1
p-Terphenyl-d14	101.		% Rec.	8270C-SIM	01/24/12	1
Polychlorinated Biphenyls						
PCB 1016	BDL	0.00050	mg/1	8082	01/30/12	1
PCB 1221	BDL	0.00050	mg/l	8082	01/30/12	1
PCB 1232	BDL	0.00050	mg/l	8082	01/30/12	1
PCB 1242	BDL	0.00050	mg/l	8082	01/30/12	1
PCB 1248	BDL	0.00050	mg/1	8082	01/30/12	1
PCB 1254	BDL	0.00050	mg/1	8082	01/30/12	1
PCB 1260	BDL	0.00050	mg/1	8082	01/30/12	1
PCBs Surrogates						
Decachlorobiphenyl	73.0		% Rec.	8082	01/30/12	1
Tetrachloro-m-xylene	67.2		% Rec.	8082	01/30/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 01/31/12 16:15 Printed: 01/31/12 16:16



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31, 2012

Site ID :

ESC Sample # : L556915-17

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

Description

Sample ID : TRIP BLANK

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Volatile Organics						
Acetone	BDL	0.050	mg/l	8260B	01/25/12	1
Acrolein	BDL	0.050	mg/l	8260B	01/21/12	1
Acrylonitrile	BDL	0.010	mg/l	8260B	01/21/12	1
Benzene	BDL	0.0010	mg/l	8260B	01/21/12	1
Bromobenzene	BDL	0.0010	mg/l	8260B	01/21/12	1
Bromodichloromethane	BDL	0.0010	mg/l	8260B	01/21/12	1
Bromoform	BDL	0.0010	mg/l	8260B	01/21/12	1
Bromomethane	BDL	0.0050	mg/l	8260B	01/21/12	1
n-Butylbenzene	BDL	0.0010	mg/l	8260B	01/21/12	1
sec-Butylbenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
tert-Butylbenzene	BDL	0.0010	mq/1	8260B	01/21/12	1
Carbon tetrachloride	BDL	0.0010	mg/1	8260B	01/21/12	1
Chlorobenzene	BDL	0.0010	mq/1	8260B	01/21/12	ī
Chlorodibromomethane	BDL	0.0010	mq/1	8260B	01/21/12	ī
Chloroethane	BDL	0.0050	mq/1	8260B	01/21/12	1
2-Chloroethyl vinyl ether	BDL	0.050	mg/l	8260B	01/21/12	1
Chloroform	BDL	0.0050	mq/1	8260B	01/21/12	1
Chloromethane	BDL	0.0030	mq/1	8260B	01/21/12	1
2-Chlorotoluene	BDL			8260B		
		0.0010	mg/l		01/21/12	1 1
4-Chlorotoluene	BDL	0.0010	mg/l	8260B	01/21/12	
1,2-Dibromo-3-Chloropropane	BDL	0.0050	mg/l	8260B	01/21/12	1
1,2-Dibromoethane	BDL	0.0010	mg/l	8260B	01/21/12	1
Dibromomethane	BDL	0.0010	mg/1	8260B	01/21/12	1
1,2-Dichlorobenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
1,3-Dichlorobenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
1,4-Dichlorobenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
Dichlorodifluoromethane	BDL	0.0050	mg/1	8260B	01/21/12	1
1,1-Dichloroethane	BDL	0.0010	mg/1	8260B	01/21/12	1
1,2-Dichloroethane	BDL	0.0010	mg/1	8260B	01/21/12	1
1,1-Dichloroethene	BDL	0.0010	mg/1	8260B	01/21/12	1
cis-1,2-Dichloroethene	BDL	0.0010	mg/1	8260B	01/21/12	1
trans-1,2-Dichloroethene	BDL	0.0010	mg/1	8260B	01/21/12	1
1,2-Dichloropropane	BDL	0.0010	mg/1	8260B	01/21/12	1
1,1-Dichloropropene	BDL	0.0010	mg/l	8260B	01/21/12	1
1,3-Dichloropropane	BDL	0.0010	mg/l	8260B	01/21/12	1
cis-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	01/21/12	1
trans-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	01/21/12	1
2,2-Dichloropropane	BDL	0.0010	mq/1	8260B	01/21/12	1
Di-isopropyl ether	BDL	0.0010	mq/1	8260B	01/21/12	1
Ethylbenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
Hexachloro-1,3-butadiene	BDL	0.0010	mg/1	8260B	01/21/12	ī
n-Hexane	BDL	0.010	mq/1	8260B	01/21/12	ī
Isopropylbenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
TOOPTOPY INCIDENCE	עעע	0.0010	1119/1	32000	01/21/12	_

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 31, 2012

Site ID :

ESC Sample # : L556915-17

Project #: 896.01A

Date Received : January 21, 2012 Description : CCLRC-Buckeye Road

Description

Sample ID : TRIP BLANK

Collected By : Tom Weir Collection Date : 01/19/12 00:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
p-Isopropyltoluene	BDL	0.0010	mg/l	8260B	01/21/12	1
2-Butanone (MEK)	BDL	0.010	mg/l	8260B	01/25/12	1
Methylene Chloride	BDL	0.0050	mg/l	8260B	01/21/12	1
4-Methyl-2-pentanone (MIBK)	BDL	0.010	mg/l	8260B	01/21/12	1
Methyl tert-butyl ether	BDL	0.0010	mg/l	8260B	01/21/12	1
Naphthalene	BDL	0.0050	mg/l	8260B	01/21/12	1
n-Propylbenzene	BDL	0.0010	mg/l	8260B	01/21/12	1
Styrene	BDL	0.0010	mg/l	8260B	01/21/12	1
1,1,1,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	01/21/12	1
1,1,2,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	01/21/12	1
Tetrachloroethene	BDL	0.0010	mg/l	8260B	01/21/12	1
Toluene	BDL	0.0050	mg/l	8260B	01/21/12	1
1,2,3-Trichlorobenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
1,2,4-Trichlorobenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
1,1,1-Trichloroethane	BDL	0.0010	mg/1	8260B	01/21/12	1
1,1,2-Trichloroethane	BDL	0.0010	mg/1	8260B	01/21/12	1
Trichloroethene	BDL	0.0010	mg/1	8260B	01/21/12	1
Trichlorofluoromethane	BDL	0.0050	mg/1	8260B	01/21/12	1
1,2,3-Trichloropropane	BDL	0.0025	mg/1	8260B	01/21/12	1
1,2,4-Trimethylbenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
1,3,5-Trimethylbenzene	BDL	0.0010	mg/1	8260B	01/21/12	1
Vinyl chloride	BDL	0.0010	mg/1	8260B	01/21/12	1
Xylenes, Total	BDL	0.0030	mg/1	8260B	01/21/12	1
Surrogate Recovery						
Toluene-d8	103.		% Rec.	8260B	01/21/12	1
Dibromofluoromethane	98.0		% Rec.	8260B	01/21/12	1
4-Bromofluorobenzene	110.		% Rec.	8260B	01/21/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 01/31/12 16:15 Printed: 01/31/12 16:16

## Summary of Remarks For Samples Printed 01/31/12 at 16:16:33

TSR Signing Reports: 134 R5 - Desired TAT

Log As by 6020 for GWs

Sample: L556915-01 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-02 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-03 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-04 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-05 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-06 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-07 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-08 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-09 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-10 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-11 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-12 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-13 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-14 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-15 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-16 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15 Sample: L556915-17 Account: PARENVOH Received: 01/21/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/31/12 16:15

Portners Env. Co	noulting	Alterr	Alternate billing information:			Analysis/Container/Preservative					rvative	Chain of Custody Page 1 of 1			
Partners Env. Co 31100 Solon Roa	•	Std	Std Quote: PARENVOH040210S									I	Prepared by:	1	
Solon, OH 44139	•								*		ļ			<b>ENVIRO</b>	ONMENTAL
	•									L.				SCIENC	E CORP.
		Report Email to	1 1A°	Eillings	artnersen	 /.com		;						12065 Leb Mt. Juliet, 7	oanon Road IN 37122
Project Description: CLR - RV	UZIZ ROOD	[C	ity/Sate	Jeve la	vw √+									,	15) 758-5858
Phone: (440) 248-6005 FAX: (440) 248-6374	Client Project #:		ESC Key:		ANT O : /			į						Phone (80 <b>C069</b>	00) 767-5859 -9
Colleged by: TOM WER	Site/Facility ID#:		P.O.#:				1			ļ					
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BR-6W-MW-3					10:00	2	X					ļ <del></del>	-		03
BR-6W-MW-4					7:00	3	×	X	-	<u> </u>	<u> </u>	<u> </u>	_ [1]	PAH VIAI	94
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*Matrix: \$\$ - Soil/Solid GW - Grou	undwater WW - Wa	steWater	DW - Drink	king Water	OT - Other	M W	4725R	1	<u> </u>	·		pН	<u>'</u>	Ter	np
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Relinquished by: (Signature)	Date:	Time:		ved for lab	by: (Signatur	re)			Date	_ /		me: 09W	,	pH Checked:	NCF:



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Al Brillinger Partners Env. Consulting - Solon, OH 31100 Solon Road, Ste. G Solon, OH 44139

## Report Summary

Monday January 30, 2012

Report Number: L557323 Samples Received: 01/25/12 Client Project: 896.16A

Description: 9615 Buckeye Rd.

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

ESC Representative Mark W. Beasley ,

## Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140. NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979

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Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

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REPORT OF ANALYSIS

Al Brillinger

Solon, OH 44139

Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G

Date Received 25, 2012 January

CCLRC Buckeye Road Description :

Sample ID : BR-GW-MW-1

Collected By Tom Weir Collection Date : 01/24/12 09:45 ESC Sample # : L557323-01

Site ID :

January 30, 2012

Project # : 896.16A

Parameter Result Det. Limit Units Method Date Dil. Volatile Organics BDL 0.050 mg/18260B 01/27/12 Acetone 1 Acrolein BDL 0.050 mg/18260B 01/27/12 1 0.010 mg/101/27/12 Acrylonitrile BDL 8260B mg/10.010 8260B 01/27/12 10 Benzene 0.45 Bromobenzene BDL 0.0010 mg/18260B 01/27/12 Bromodichloromethane BDL 0.0010 mg/18260B 01/27/12 1 01/27/12 01/27/12 Bromoform BDL 0.0010 mg/18260B 1 mg/18260B Bromomet.hane 0.0050 1 BDL 0.0024 0.0010 mg/18260B 01/27/12 n-But.vlbenzene 1 mg/101/27/12 sec-Butylbenzene 0.0024 0.0010 8260B tert-Butylbenzene BDL 0.0010 mg/18260B 01/27/12 1 mg/1Carbon tetrachloride BDL 0.0010 8260B 01/27/12 1 Chlorobenzene BDL 0.0010 mg/18260B 01/27/12 1 Chlorodibromomethane BDL 0.0010 mg/18260B 01/27/12 1 Chloroethane BDT. 0.0050 mg/18260B 01/27/12 01/27/12 1 0.050 2-Chloroethyl vinyl ether mg/18260B 1 BDL mg/1Chloroform 0.0050 8260B 01/27/12 BDL 1 01/27/12 Chloromethane BDL 0.0025 mg/18260B 0.0010 mg/101/27/12 2-Chlorotoluene BDL 8260B mg/14-Chlorotoluene BDL 0.0010 8260B 01/27/12 1 1,2-Dibromo-3-Chloropropane BDL 0.0050 mg/18260B 01/27/12 1 01/27/12 01/27/12 1,2-Dibromoethane BDT. 0.0010 mg/18260B 1 0.0010 mg/18260B Dibromomethane BDL 1 mg/101/27/12 1.2-Dichlorobenzene BDL 0.0010 8260B 1 01/27/12 1,3-Dichlorobenzene BDL 0.0010 mg/18260B 0.0010 01/27/12 1,4-Dichlorobenzene BDL mg/18260B Dichlorodifluoromethane BDL 0.0050 mg/18260B 01/27/12 1 1,1-Dichloroethane BDL 0.0010 mg/18260B 01/27/12 1,2-Dichloroethane BDL 0.0010 mg/18260B 01/27/12 1 0.0010 01/27/12 01/27/12 1,1-Dichloroethene BDT. mg/18260B 1 cis-1,2-Dichloroethene trans-1,2-Dichloroethene 1,2-Dichloropropane 8260B mg/1BDL 0.0010 1 0.0010 mg/101/27/12 BDL 8260B 1 mg/101/27/12 BDL 0.0010 8260B 1,1-Dichloropropene BDL 0.0010 mg/18260B 01/27/12 1,3-Dichloropropane BDL 0.0010 mg/18260B 01/27/12 cis-1,3-Dichloropropene BDL 0.0010 mg/18260B 01/27/12 1 01/27/12 trans-1,3-Dichloropropene BDL 0.0010 mg/18260B 1 2,2-Dichloropropane BDT. 0.0010 mg/18260B 01/27/12 1 01/27/12 0.0010 mg/1Di-isopropyl ether BDL 8260B mq/18260B 01/27/12 Ethylbenzene 0.22 0.010 10 BDL 01/27/12 Hexachloro-1,3-butadiene 0.0010 mg/18260B 1 0.010 01/27/12 n-Hexane BDL mg/18260B Isopropylbenzene 0.015 0.0010 8260B 01/27/12 1 mq/1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557323-01

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Sample ID : BR-GW-MW-1

Collected By : Tom Weir Collection Date : 01/24/12 09:45

Project #: 896.16A

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
p-Isopropyltoluene	0.0035	0.0010	mq/l	8260B	01/27/12	1
2-Butanone (MEK)	BDL	0.010	mg/l	8260B	01/27/12	1
Methylene Chloride	BDL	0.0050	mg/l	8260B	01/27/12	1
4-Methyl-2-pentanone (MIBK)	BDL	0.010	mg/l	8260B	01/27/12	1
Methyl tert-butyl ether	0.0012	0.0010	mg/l	8260B	01/27/12	1
Naphthalene	0.045	0.0050	mg/l	8260B	01/27/12	1
n-Propylbenzene	0.035	0.0010	mg/l	8260B	01/27/12	_ 1
Styrene	BDL	0.0010	mg/1	8260B	01/27/12	1
1,1,1,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	01/27/12	ī
1,1,2,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	01/27/12	ī
Tetrachloroethene	BDL	0.0010	mg/l	8260B	01/27/12	ī
Toluene	BDL	0.0050	mg/l	8260B	01/27/12	1
1,2,3-Trichlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12	ī
1,2,4-Trichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,1-Trichloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,2-Trichloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
Trichloroethene	BDL	0.0010	mg/l	8260B	01/27/12	1
Trichlorofluoromethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,2,3-Trichloropropane	BDL	0.0030	mg/1	8260B	01/27/12	1
1,2,4-Trimethylbenzene	0.26	0.0025	mq/1	8260B		10
	0.26	0.010		8260B	01/27/12 01/27/12	1
1,3,5-Trimethylbenzene	0.044 BDL	0.0010	mg/l	8260B 8260B		1
Vinyl chloride	0.14		mg/l	8260B 8260B	01/27/12	1
Xylenes, Total	0.14	0.0030	mg/l	826UB	01/27/12	Τ
Surrogate Recovery	102.		0 D	00605	01/07/10	1
Toluene-d8	102. 94.9		% Rec.	8260B	01/27/12	1
Dibromofluoromethane			% Rec.	8260B	01/27/12	1
4-Bromofluorobenzene	98.9		% Rec.	8260B	01/27/12	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Acenaphthene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Acenaphthylene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Benzo(a)anthracene	BDL	0.000050	${\tt mg/l}$	8270C-SIM	01/26/12	1
Benzo(a)pyrene	BDL	0.000050	${\tt mg/l}$	8270C-SIM	01/26/12	1
Benzo(b)fluoranthene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Benzo(g,h,i)perylene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Benzo(k)fluoranthene	BDL	0.000050	mg/l	8270C-SIM	01/26/12	1
Chrysene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Dibenz(a,h)anthracene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Fluoranthene	BDL	0.000050	mg/l	8270C-SIM	01/26/12	1
Fluorene	BDL	0.000050	mg/l	8270C-SIM	01/26/12	1
Indeno(1,2,3-cd)pyrene	BDL	0.000050	mg/l	8270C-SIM	01/26/12	1
Naphthalene	0.026	0.00025	mg/l	8270C-SIM	01/26/12	1
Phenanthrene	0.000067	0.000050	mg/l	8270C-SIM	01/26/12	1
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BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557323-01

Project #: 896.16A

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Sample ID : BR-GW-MW-1

Collected By : Tom Weir Collection Date : 01/24/12 09:45

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Pyrene	BDL	0.000050	mq/l	8270C-SIM	01/26/12	1
1-Methylnaphthalene	0.0036	0.00025	mq/1	8270C-SIM	01/26/12	1
2-Methylnaphthalene	0.0058	0.00025	mg/l	8270C-SIM	01/26/12	1
2-Chloronaphthalene	BDL	0.00025	mg/l	8270C-SIM	01/26/12	1
Surrogate Recovery			_			
Nitrobenzene-d5	94.8		% Rec.	8270C-SIM	01/26/12	1
2-Fluorobiphenyl	79.6		% Rec.	8270C-SIM	01/26/12	1
p-Terphenyl-d14	61.3		% Rec.	8270C-SIM	01/26/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 01/30/12 13:50 Printed: 01/30/12 13:50



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

ESC Sample # : L557323-02

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Sample ID : BR-GW-MW-2

Collected By : Tom Weir Collection Date : 01/24/12 09:25

Project #: 896.16A

Site ID :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Volatile Organics						
Acetone	BDL	0.050	mg/l	8260B	01/27/12	1
Acrolein	BDL	0.050	mg/l	8260B	01/27/12	1
Acrylonitrile	BDL	0.010	mg/l	8260B	01/27/12	1
Benzene	0.050	0.0010	mg/l	8260B	01/27/12	1
Bromobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromodichloromethane	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromoform	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromomethane	BDL	0.0050	mg/l	8260B	01/27/12	1
n-Butylbenzene	0.0017	0.0010	mg/l	8260B	01/27/12	1
sec-Butylbenzene	0.0025	0.0010	mg/l	8260B	01/27/12	1
tert-Butylbenzene	BDL	0.0010	mq/1	8260B	01/27/12	1
Carbon tetrachloride	BDL	0.0010	mq/1	8260B	01/27/12	ī
Chlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12	1
Chlorodibromomethane	BDL	0.0010	mq/1	8260B	01/27/12	1
Chloroethane	BDL	0.0050	mg/1	8260B	01/27/12	1
2-Chloroethyl vinyl ether	BDL	0.050	mg/1	8260B	01/27/12	1
Chloroform	BDL	0.0050	mg/l	8260B	01/27/12	1
Chloromethane	BDL	0.0035	mg/l	8260B	01/27/12	1
2-Chlorotoluene	BDL	0.0023	mq/1	8260B	01/27/12	1
4-Chlorotoluene	BDL	0.0010	mq/1	8260B	01/27/12	1
1,2-Dibromo-3-Chloropropane	BDL	0.0010	mq/1	8260B	01/27/12	1
1,2-Dibromo-3-Chioropropane 1,2-Dibromoethane	BDL	0.0050		8260B 8260B	01/27/12	1
Dibromomethane	BDL	0.0010	mg/l mg/l	8260B 8260B	01/27/12	1
						_
1,2-Dichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,3-Dichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,4-Dichlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12	1
Dichlorodifluoromethane	BDL	0.0050	mg/l	8260B	01/27/12	1
1,1-Dichloroethane	BDL	0.0010	mg/1	8260B	01/27/12	1
1,2-Dichloroethane	BDL	0.0010	mg/1	8260B	01/27/12	1
1,1-Dichloroethene	BDL	0.0010	mg/1	8260B	01/27/12	1
cis-1,2-Dichloroethene	BDL	0.0010	mg/1	8260B	01/27/12	1
trans-1,2-Dichloroethene	BDL	0.0010	mg/1	8260B	01/27/12	1
1,2-Dichloropropane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1-Dichloropropene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,3-Dichloropropane	BDL	0.0010	mg/l	8260B	01/27/12	1
cis-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	01/27/12	1
trans-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	01/27/12	1
2,2-Dichloropropane	BDL	0.0010	mg/1	8260B	01/27/12	1
Di-isopropyl ether	BDL	0.0010	mg/1	8260B	01/27/12	1
Ethylbenzene	0.041	0.0010	mg/l	8260B	01/27/12	1
Hexachloro-1,3-butadiene	BDL	0.0010	mg/l	8260B	01/27/12	1
n-Hexane	BDL	0.010	mg/l	8260B	01/27/12	1
Isopropylbenzene	0.0095	0.0010	mg/l	8260B	01/27/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

ESC Sample # : L557323-02

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Sample ID : BR-GW-MW-2

Collected By : Tom Weir Collection Date : 01/24/12 09:25

Project #: 896.16A

Site ID :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
p-Isopropyltoluene	BDL	0.0010	mq/l	8260B	01/27/12	1
2-Butanone (MEK)	0.012	0.010	mg/1	8260B	01/27/12	1
Methylene Chloride	BDL	0.0050	mg/l	8260B	01/27/12	ī
4-Methyl-2-pentanone (MIBK)	BDL	0.010	mq/l	8260B	01/27/12	1
Methyl tert-butyl ether	BDL	0.0010	mg/l	8260B	01/27/12	1
Naphthalene	0.014	0.0010	mq/l	8260B	01/27/12	1
n-Propylbenzene	0.014	0.0030	mg/l	8260B	01/27/12	1
Styrene	BDL	0.0010	ma/l	8260B	01/27/12	1
1,1,1,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,2,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
Tetrachloroethene	BDL	0.0010	mg/l	8260B	01/27/12	1
Toluene		0.0010	mq/1	8260B	01/27/12	1
	BDL					1
1,2,3-Trichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	_
1,2,4-Trichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,1-Trichloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,2-Trichloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
Trichloroethene	BDL	0.0010	mg/1	8260B	01/27/12	1
Trichlorofluoromethane	BDL	0.0050	mg/1	8260B	01/27/12	1
1,2,3-Trichloropropane	BDL	0.0025	mg/l	8260B	01/27/12	1
1,2,4-Trimethylbenzene	0.033	0.0010	mg/1	8260B	01/27/12	1
1,3,5-Trimethylbenzene	0.0025	0.0010	mg/1	8260B	01/27/12	1
Vinyl chloride	BDL	0.0010	mg/1	8260B	01/27/12	1
Xylenes, Total	0.0074	0.0030	mg/1	8260B	01/27/12	1
Surrogate Recovery						
Toluene-d8	102.		% Rec.	8260B	01/27/12	1
Dibromofluoromethane	99.7		% Rec.	8260B	01/27/12	1
4-Bromofluorobenzene	100.		% Rec.	8260B	01/27/12	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.00013	0.000050	mg/1	8270C-SIM	01/26/12	1
Acenaphthene	0.00070	0.000050	mg/l	8270C-SIM	01/26/12	1
Acenaphthylene	BDL	0.000050	mg/l	8270C-SIM	01/26/12	1
Benzo(a)anthracene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Benzo(a)pyrene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Benzo(b)fluoranthene	BDL	0.000050	mg/l	8270C-SIM	01/26/12	1
Benzo(q,h,i)perylene	BDL	0.000050	mg/l	8270C-SIM	01/26/12	1
Benzo(k)fluoranthene	BDL	0.000050	ma/l	8270C-SIM	01/26/12	1
Chrysene	BDL	0.000050	mg/l	8270C-SIM	01/26/12	1
Dibenz(a,h)anthracene	BDL	0.000050	mq/l	8270C-SIM	01/26/12	1
Fluoranthene	0.00017	0.000050	mg/l	8270C-SIM	01/26/12	_ 1
Fluorene	0.00039	0.000050	mg/l	8270C-SIM	01/26/12	1
Indeno(1,2,3-cd)pyrene	BDL	0.000050	mg/l	8270C-SIM	01/26/12	ī
Naphthalene	0.0096	0.00025	ma/l	8270C-SIM	01/26/12	1
Phenanthrene	0.00066	0.000050	mg/l	8270C-SIM	01/26/12	1
1 1101101111 0110	3.0000	0.00000	5/ -	32700 5111	01/20/12	-

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557323-02

Project #: 896.16A

Date Received : January 25, 2012 Description : CCLRC Buckeye Road Description

Sample ID : BR-GW-MW-2

Collected By : Tom Weir Collection Date : 01/24/12 09:25

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Pyrene	0.00014	0.000050	mq/l	8270C-SIM	01/26/12	1
1-Methylnaphthalene	0.0051	0.00025	mg/l	8270C-SIM	01/26/12	1
2-Methylnaphthalene	0.0063	0.00025	mg/l	8270C-SIM	01/26/12	1
2-Chloronaphthalene	BDL	0.00025	mg/l	8270C-SIM	01/26/12	1
Surrogate Recovery			_			
Nitrobenzene-d5	97.0		% Rec.	8270C-SIM	01/26/12	1
2-Fluorobiphenyl	87.5		% Rec.	8270C-SIM	01/26/12	1
p-Terphenyl-d14	82.7		% Rec.	8270C-SIM	01/26/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 01/30/12 13:50 Printed: 01/30/12 13:51



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557323-03

Project #: 896.16A

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Sample ID : BR-GW-MW-3

Collected By : Tom Weir Collection Date : 01/24/12 10:00

BDL BDL 0.30 BDL BDL BDL BDL 0.023 BDL	1.0 1.0 0.20 0.020 0.020 0.020 0.020 0.10	mg/l mg/l mg/l mg/l mg/l mg/l mg/l	8260B 8260B 8260B 8260B 8260B 8260B 8260B 8260B	01/27/12 01/27/12 01/27/12 01/27/12 01/27/12 01/27/12 01/27/12	20 20 20 20 20 20 20
BDL BDL 0.30 BDL BDL BDL BDL 0.023 BDL	1.0 0.20 0.020 0.020 0.020 0.020 0.10 0.020	mg/l mg/l mg/l mg/l mg/l mg/l mg/l	8260B 8260B 8260B 8260B 8260B 8260B	01/27/12 01/27/12 01/27/12 01/27/12 01/27/12	20 20 20 20 20 20
BDL 0.30 BDL BDL BDL 0.023 BDL	0.20 0.020 0.020 0.020 0.020 0.10 0.020	mg/l mg/l mg/l mg/l mg/l mg/l mg/l	8260B 8260B 8260B 8260B 8260B 8260B	01/27/12 01/27/12 01/27/12 01/27/12 01/27/12	20 20 20 20 20
0.30 BDL BDL BDL BDL 0.023 BDL	0.020 0.020 0.020 0.020 0.020 0.10 0.020	mg/l mg/l mg/l mg/l mg/l mg/l	8260B 8260B 8260B 8260B	01/27/12 01/27/12 01/27/12	20 20 20
BDL BDL BDL BDL 0.023 BDL	0.020 0.020 0.020 0.10 0.020	mg/l mg/l mg/l mg/l mg/l	8260B 8260B 8260B	01/27/12 01/27/12 01/27/12	20 20
BDL BDL BDL 0.023 BDL	0.020 0.020 0.10 0.020	mg/l mg/l mg/l mg/l	8260B 8260B	01/27/12	20
BDL BDL 0.023 BDL	0.020 0.10 0.020	mg/l mg/l	8260B		
BDL 0.023 BDL	0.10 0.020	mg/l mg/l		01/27/12	
0.023 BDL	0.020	mg/1	8260B		20
BDL				01/27/12	20
	1 1 1 1 1	mq/1	8260B	01/27/12	20
דתת	0.020	mg/l	8260B	01/27/12	20
RDL			8260B		20
BDL					20
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BDL					20
BDL	0.020		8260B		20
BDL	0.020		8260B		20
BDL					20
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BDL			8260B		20
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BDL			8260B		20
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	BDL BDL BDL BDL BDL BDL BDL BDL BDL BDL	BDL 0.020 BDL 0.10 BDL 0.020 BDL 0.10 BDL 0.10 BDL 0.050 BDL 0.020	BDL 0.020 mg/1 BDL 0.020 mg/1 BDL 0.020 mg/1 BDL 0.10 mg/1 BDL 1.0 mg/1 BDL 0.10 mg/1 BDL 0.050 mg/1 BDL 0.050 mg/1 BDL 0.020 mg/1	BDL 0.020 mg/l 8260B BDL 0.020 mg/l 8260B BDL 0.10 mg/l 8260B BDL 1.0 mg/l 8260B BDL 1.0 mg/l 8260B BDL 0.10 mg/l 8260B BDL 0.10 mg/l 8260B BDL 0.050 mg/l 8260B BDL 0.050 mg/l 8260B BDL 0.020 mg/l 8260B	BDL 0.020 mg/l 8260B 01/27/12 BDL 0.020 mg/l 8260B 01/27/12 BDL 0.020 mg/l 8260B 01/27/12 BDL 0.10 mg/l 8260B 01/27/12 BDL 1.0 mg/l 8260B 01/27/12 BDL 1.0 mg/l 8260B 01/27/12 BDL 0.10 mg/l 8260B 01/27/12 BDL 0.050 mg/l 8260B 01/27/12 BDL 0.050 mg/l 8260B 01/27/12 BDL 0.020 mg/l 8260B 01/27/12

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557323-03

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Sample ID : BR-GW-MW-3

Collected By : Tom Weir Collection Date : 01/24/12 10:00

Project #: 896.16A

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
p-Isopropyltoluene	BDL	0.020	mg/l	8260B	01/27/12	20
2-Butanone (MEK)	BDL	0.20	mg/l	8260B	01/27/12	20
Methylene Chloride	BDL	0.10	mg/l	8260B	01/27/12	20
4-Methyl-2-pentanone (MIBK)	BDL	0.20	mg/l	8260B	01/27/12	20
Methyl tert-butyl ether	BDL	0.020	mg/l	8260B	01/27/12	20
Naphthalene	0.52	0.10	mg/l	8260B	01/27/12	20
n-Propylbenzene	0.20	0.020	mg/l	8260B	01/27/12	20
Styrene	BDL	0.020	mg/l	8260B	01/27/12	20
1,1,1,2-Tetrachloroethane	BDL	0.020	mg/l	8260B	01/27/12	20
1,1,2,2-Tetrachloroethane	BDL	0.020	mg/l	8260B	01/27/12	20
Tetrachloroethene	BDL	0.020	mg/l	8260B	01/27/12	20
Toluene	BDL	0.10	mg/l	8260B	01/27/12	20
1,2,3-Trichlorobenzene	BDL	0.020	mg/1	8260B	01/27/12	20
1,2,4-Trichlorobenzene	BDL	0.020	mg/1	8260B	01/27/12	20
1,1,1-Trichloroethane	BDL	0.020	mg/1	8260B	01/27/12	20
1,1,2-Trichloroethane	BDL	0.020	mg/1	8260B	01/27/12	20
Trichloroethene	BDL	0.020	mg/l	8260B	01/27/12	20
Trichlorofluoromethane	BDL	0.10	mg/l	8260B	01/27/12	20
1,2,3-Trichloropropane	BDL	0.050	mg/l	8260B	01/27/12	20
1,2,4-Trimethylbenzene	1.2	0.020	mg/l	8260B	01/27/12	20
1,3,5-Trimethylbenzene	0.24	0.020	mg/1	8260B	01/27/12	20
Vinyl chloride	BDL	0.020	mg/l	8260B	01/27/12	20
Xylenes, Total	0.52	0.060	mg/1	8260B	01/27/12	20
Surrogate Recovery						
Toluene-d8	104.		% Rec.	8260B	01/27/12	20
Dibromofluoromethane	106.		% Rec.	8260B	01/27/12	20
4-Bromofluorobenzene	94.7		% Rec.	8260B	01/27/12	20

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 01/30/12 13:50 Printed: 01/30/12 13:51



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Tax I.D. 62-0814289

Est. 1970

January 30, 2012

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Sample ID : BR-GW-MW-4

Collected By : Tom Weir Collection Date : 01/24/12 09:00

ESC Sample # : L557323-04

Site ID :

Project #: 896.16A

Parameter	Result	Det. Limit	Units	Method	Date Dil.
Volatile Organics					
Acetone	BDL	0.050	mq/1	8260B	01/27/12 1
Acrolein	BDL	0.050	mg/l	8260B	01/27/12 1
Acrylonitrile	BDL	0.010	mg/l	8260B	01/27/12 1
Benzene	BDL	0.0010	mg/l	8260B	01/27/12 1
Bromobenzene	BDL	0.0010	mg/l	8260B	01/27/12 1
Bromodichloromethane	BDL	0.0010	mg/1	8260B	01/27/12 1
Bromoform	BDL	0.0010	mg/1	8260B	01/27/12 1
Bromomethane	BDL	0.0050	mg/l	8260B	01/27/12 1
n-Butvlbenzene	BDL	0.0010	mq/1	8260B	01/27/12 1
sec-Butylbenzene	BDL	0.0010	mg/1	8260B	01/27/12 1
tert-Butylbenzene	BDL	0.0010	mg/l	8260B	01/27/12 1
Carbon tetrachloride	BDL	0.0010	mg/l	8260B	01/27/12 1
Chlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12 1
Chlorodibromomethane	BDL	0.0010	mg/l	8260B	01/27/12 1
Chloroethane	BDL	0.0010	mg/l	8260B	01/27/12 1
2-Chloroethyl vinyl ether	BDL	0.050	mg/l	8260B	01/27/12 1
Chloroform	BDL	0.050	mq/1	8260B	01/27/12 1
Chloromethane	BDL	0.0030	mq/1	8260B	01/27/12 1
2-Chlorotoluene	BDL	0.0025		8260B	
4-Chlorotoluene		0.0010	mg/1	8260B 8260B	01/27/12 1 $01/27/12$ 1
	BDL		mg/l		,,
1,2-Dibromo-3-Chloropropane	BDL	0.0050	mg/l	8260B	01/27/12 1
1,2-Dibromoethane	BDL	0.0010	mg/l	8260B	01/27/12 1
Dibromomethane	BDL	0.0010	mg/l	8260B	01/27/12 1
1,2-Dichlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12 1
1,3-Dichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12 1
1,4-Dichlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12 1
Dichlorodifluoromethane	BDL	0.0050	mg/1	8260B	01/27/12 1
1,1-Dichloroethane	BDL	0.0010	mg/1	8260B	01/27/12 1
1,2-Dichloroethane	BDL	0.0010	mg/1	8260B	01/27/12 1
1,1-Dichloroethene	BDL	0.0010	mg/1	8260B	01/27/12 1
cis-1,2-Dichloroethene	BDL	0.0010	mg/1	8260B	01/27/12 1
trans-1,2-Dichloroethene	BDL	0.0010	mg/1	8260B	01/27/12 1
1,2-Dichloropropane	BDL	0.0010	mg/1	8260B	01/27/12 1
1,1-Dichloropropene	BDL	0.0010	mg/1	8260B	01/27/12 1
1,3-Dichloropropane	BDL	0.0010	mg/l	8260B	01/27/12 1
cis-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	01/27/12 1
trans-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	01/27/12 1
2,2-Dichloropropane	BDL	0.0010	mg/1	8260B	01/27/12 1
Di-isopropyl ether	BDL	0.0010	mg/l	8260B	01/27/12 1
Ethylbenzene	BDL	0.0010	mg/l	8260B	01/27/12 1
Hexachloro-1,3-butadiene	BDL	0.0010	mg/1	8260B	01/27/12 1
n-Hexane	BDL	0.010	mg/1	8260B	01/27/12 1
Isopropylbenzene	BDL	0.0010	mg/1	8260B	01/27/12 1
			J		- · · - <del>-</del>

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

Date Received : January 25, 2012 Description : CCLRC Buckeye Road Description

Sample ID : BR-GW-MW-4

Collected By : Tom Weir Collection Date : 01/24/12 09:00

ESC Sample # : L557323-04

Site ID :

January 30, 2012

Project #: 896.16A

p-Isopropyltoluene	Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Methylene Chloride	p-Isopropyltoluene	BDL	0.0010	mg/l	8260B	01/27/12	1
A-Methyl-2-pentanone (MIBK)   BDL   0.010   mg/1   8260B   01/27/12   1	2-Butanone (MEK)	BDL	0.010	mg/1	8260B	01/27/12	1
Methyl tert-butyl ether	Methylene Chloride	BDL	0.0050	mg/l	8260B	01/27/12	1
Naphthalene	4-Methyl-2-pentanone (MIBK)	BDL	0.010	mg/l	8260B	01/27/12	1
Naphthalene	Methyl tert-butyl ether	BDL	0.0010	mg/l	8260B	01/27/12	1
n-Propylbenzene		BDL	0.0050	mg/l	8260B		1
Styrene		BDL			8260B		1
1,1,2-Tetrachloroethane							1
1,1,2,2-Tetrachloroethane							1
Tetrachloroethene							1
Toluene BDL 0.0050 mg/l 8260B 01/27/12 1 1,2,3-Trichlorobenzene BDL 0.0010 mg/l 8260B 01/27/12 1 1,2,4-Trichlorobenzene BDL 0.0010 mg/l 8260B 01/27/12 1 1,1,1-Trichloroethane BDL 0.0010 mg/l 8260B 01/27/12 1 1,1,2-Trichloroethane BDL 0.0010 mg/l 8260B 01/27/12 1 1,1,2-Trichloroethane BDL 0.0010 mg/l 8260B 01/27/12 1 Trichloroethene BDL 0.0010 mg/l 8260B 01/27/12 1 Trichlorofluoromethane BDL 0.0010 mg/l 8260B 01/27/12 1 1,2,3-Trichloropropane BDL 0.0050 mg/l 8260B 01/27/12 1 1,2,3-Trichloropropane BDL 0.0055 mg/l 8260B 01/27/12 1 1,2,4-Trimethylbenzene BDL 0.0055 mg/l 8260B 01/27/12 1 1,2,4-Trimethylbenzene BDL 0.0010 mg/l 8260B 01/27/12 1 1,3,5-Trimethylbenzene BDL 0.0010 mg/l 8260B 01/27/12 1 1,3,5-Trimethylbenzene BDL 0.0010 mg/l 8260B 01/27/12 1 Vinyl chloride BDL 0.0010 mg/l 8260B 01/27/12 1 Vinyl chloride BDL 0.0010 mg/l 8260B 01/27/12 1 Vinyl chlorode BDL 0.0010 mg/l 8260B 01/27/12 1 Vinyl chlorode BDL 0.0010 mg/l 8260B 01/27/12 1 Vinyl chlorode BDL 0.0010 mg/l 8260B 01/27/12 1 Vinyl chloride BDL 0.0000 mg/l 8270C-SIM 01/27/12 1 Vinyl chloride BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Vinyl							
1,2,3-Trichlorobenzene							
1,2,4-Trichlorobenzene							
1,1,1-Trichloroethane							
1,1,2-Trichloroethane							
Trichloroethene BDL 0.0010 mg/l 8260B 01/27/12 1 Trichlorofluoromethane BDL 0.0050 mg/l 8260B 01/27/12 1 1,2,3-Trichloropropane BDL 0.0025 mg/l 8260B 01/27/12 1 1,2,4-Trimethylbenzene BDL 0.0010 mg/l 8260B 01/27/12 1 1,3,5-Trimethylbenzene BDL 0.0010 mg/l 8260B 01/27/12 1 1,3,5-Trimethylbenzene BDL 0.0010 mg/l 8260B 01/27/12 1 Vinyl chloride BDL 0.0010 mg/l 8260B 01/27/12 1 Xylenes, Total BDL 0.0010 mg/l 8260B 01/27/12 1 Surrogate Recovery Toluene-d8 105. Rec. 8260B 01/27/12 1 Dibromofluoromethane 107. Rec. 8260B 01/27/12 1 Dibromofluorobenzene 96.4 Rec. 8260B 01/27/12 1 Polynuclear Aromatic Hydrocarbons Anthracene 0.000083 0.000050 mg/l 8270C-SIM 01/27/12 1 Acenaphthene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(a)anthracene 0.000060 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(a)anthracene 0.000060 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(a)fluoranthene 0.000060 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(a)fluoranthene 0.000060 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(g)h,i)perylene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(g)h,i)perylene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(k)fluoranthene BDL 0.000050 mg/l 8270C-SIM 01							
Trichlorofluoromethane							
1,2,3-Trichloropropane							
1,2,4-Trimethylbenzene							
1,3,5-Trimethylbenzene							
Vinyl chloride         BDL         0.0010         mg/l         8260B         01/27/12         1           Xylenes, Total         BDL         0.0030         mg/l         8260B         01/27/12         1           Surrogate Recovery         Toluene-d8         105.         % Rec.         8260B         01/27/12         1           Dibromofluoromethane         107.         % Rec.         8260B         01/27/12         1           4-Bromofluorobenzene         96.4         % Rec.         8260B         01/27/12         1           Polynuclear Aromatic Hydrocarbons         Anthracene         0.000083         0.000050         mg/l         8270C-SIM         01/27/12         1           Acenaphthene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Acenaphthylene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(a)anthracene         0.000060         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(a)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(b)fluoranthene         0.000062         0.000							
Xylenes, Total         BDL         0.0030         mg/l         8260B         01/27/12         1           Surrogate Recovery         Toluene-d8         105.         \$ Rec.         8260B         01/27/12         1           Dibromofluoromethane         107.         \$ Rec.         8260B         01/27/12         1           4-Bromofluorobenzene         96.4         \$ Rec.         8260B         01/27/12         1           Polynuclear Aromatic Hydrocarbons         Anthracene         0.000050         mg/l         8270C-SIM         01/27/12         1           Acenaphthene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Acenaphthylene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(a)anthracene         0.000060         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(a)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(b)fluoranthene         0.000062         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(k)fluoranthene         BDL         0.00005							_
Surrogate Recovery   Toluene-d8							_
Toluene-d8		מעם	0.0030	mg/ I	02000	01/2//12	_
Dibromofluoromethane         107.         % Rec.         8260B         01/27/12         1           4-Bromofluorobenzene         96.4         % Rec.         8260B         01/27/12         1           Polynuclear Aromatic Hydrocarbons           Anthracene         0.000083         0.000050         mg/l         8270C-SIM         01/27/12         1           Acenaphthene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Acenaphthylene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(a)anthracene         0.000060         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(a)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(b)fluoranthene         0.000062         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(k)fluoranthene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(a)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(b)fluoranthene		105		% Pod	9260B	01/27/12	1
4-Bromofluorobenzene       96.4       % Rec.       8260B       01/27/12       1         Polynuclear Aromatic Hydrocarbons Anthracene       0.000083       0.000050       mg/l       8270C-SIM       01/27/12       1         Acenaphthene       BDL       0.000050       mg/l       8270C-SIM       01/27/12       1         Acenaphthylene       BDL       0.000050       mg/l       8270C-SIM       01/27/12       1         Benzo(a)anthracene       0.000060       0.000050       mg/l       8270C-SIM       01/27/12       1         Benzo(a)pyrene       BDL       0.000050       mg/l       8270C-SIM       01/27/12       1         Benzo(b)fluoranthene       0.000062       0.000050       mg/l       8270C-SIM       01/27/12       1         Benzo(k)fluoranthene       BDL       0.000050       mg/l       8270C-SIM       01/27/12       1         Chrysene       0.000069       0.000050       mg/l       8270C-SIM       01/27/12       1         Dibenz(a,h)anthracene       BDL       0.000050       mg/l       8270C-SIM       01/27/12       1         Fluoranthene       0.0001       0.00050       mg/l       8270C-SIM       01/27/12       1 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>							
Polynuclear Aromatic Hydrocarbons         0.000083         0.000050         mg/l         8270C-SIM         01/27/12         1           Acenaphthene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Acenaphthylene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(a)anthracene         0.000060         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(a)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(b)fluoranthene         0.000062         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(k)fluoranthene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(k)fluoranthene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Chrysene         0.000069         0.000050         mg/l         8270C-SIM         01/27/12         1           Dibenz(a,h)anthracene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluoranthene         0.00013							
Anthracene		90.4		% Rec.	0200B	01/2//12	T
Acenaphthene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(a)anthracene 0.000060 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(a)pyrene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(b)fluoranthene 0.000062 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(g,h,i)perylene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(g,h,i)perylene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(k)fluoranthene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(k)fluoranthene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Chrysene 0.000069 0.000050 mg/l 8270C-SIM 01/27/12 1 Dibenz(a,h)anthracene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Dibenz(a,h)anthracene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Fluoranthene 0.00013 0.000050 mg/l 8270C-SIM 01/27/12 1 Fluorene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Indeno(1,2,3-cd)pyrene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Naphthalene BDL 0.00025 mg/l 8270C-SIM 01/27/12 1							
Acenaphthylene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(a)anthracene 0.000060 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(a)pyrene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(b)fluoranthene 0.000062 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(g,h,i)perylene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(k)fluoranthene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Benzo(k)fluoranthene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Chrysene 0.000069 0.000050 mg/l 8270C-SIM 01/27/12 1 Dibenz(a,h)anthracene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Fluoranthene 0.00013 0.000050 mg/l 8270C-SIM 01/27/12 1 Fluorene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Indeno(1,2,3-cd)pyrene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Naphthalene BDL 0.00055 mg/l 8270C-SIM 01/27/12 1		0.000083					
Benzo(a)anthracene         0.000060         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(a)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(b)fluoranthene         0.000062         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(g,h,i)perylene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(k)fluoranthene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Chrysene         0.000069         0.000050         mg/l         8270C-SIM         01/27/12         1           Dibenz(a,h)anthracene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluoranthene         0.00013         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluorene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Indeno(1,2,3-cd)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Naphthalene         BDL         0.00025 <td></td> <td>BDL</td> <td></td> <td></td> <td></td> <td></td> <td></td>		BDL					
Benzo(a)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(b)fluoranthene         0.000062         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(g,h,i)perylene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(k)fluoranthene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Chrysene         0.000069         0.000050         mg/l         8270C-SIM         01/27/12         1           Dibenz(a,h)anthracene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluoranthene         0.00013         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluorene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Indeno(1,2,3-cd)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Naphthalene         BDL         0.00025         mg/l         8270C-SIM         01/27/12         1			0.000050	mg/l	8270C-SIM	01/27/12	
Benzo(b)fluoranthene       0.000062       0.000050       mg/l       8270C-SIM       01/27/12       1         Benzo(g,h,i)perylene       BDL       0.000050       mg/l       8270C-SIM       01/27/12       1         Benzo(k)fluoranthene       BDL       0.000050       mg/l       8270C-SIM       01/27/12       1         Chrysene       0.000069       0.000050       mg/l       8270C-SIM       01/27/12       1         Dibenz(a,h)anthracene       BDL       0.000050       mg/l       8270C-SIM       01/27/12       1         Fluoranthene       0.00013       0.000050       mg/l       8270C-SIM       01/27/12       1         Fluorene       BDL       0.000050       mg/l       8270C-SIM       01/27/12       1         Indeno(1,2,3-cd)pyrene       BDL       0.000050       mg/l       8270C-SIM       01/27/12       1         Naphthalene       BDL       0.00025       mg/l       8270C-SIM       01/27/12       1	Benzo(a)anthracene	0.000060	0.000050	mg/l	8270C-SIM	01/27/12	1
Benzo(g,h,i)perylene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Benzo(k)fluoranthene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Chrysene         0.000069         0.000050         mg/l         8270C-SIM         01/27/12         1           Dibenz(a,h)anthracene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluoranthene         0.00013         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluorene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Indeno(1,2,3-cd)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Naphthalene         BDL         0.00025         mg/l         8270C-SIM         01/27/12         1	Benzo(a)pyrene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
Benzo(k)fluoranthene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Chrysene         0.000069         0.000050         mg/l         8270C-SIM         01/27/12         1           Dibenz(a,h)anthracene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluoranthene         0.00013         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluorene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Indeno(1,2,3-cd)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Naphthalene         BDL         0.00025         mg/l         8270C-SIM         01/27/12         1	Benzo(b)fluoranthene	0.000062	0.000050	mg/l	8270C-SIM	01/27/12	
Chrysene         0.000069         0.000050         mg/l         8270C-SIM         01/27/12         1           Dibenz(a,h)anthracene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluoranthene         0.00013         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluorene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Indeno(1,2,3-cd)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Naphthalene         BDL         0.00025         mg/l         8270C-SIM         01/27/12         1	Benzo(g,h,i)perylene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
Dibenz(a,h)anthracene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluoranthene         0.00013         0.000050         mg/l         8270C-SIM         01/27/12         1           Fluorene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Indeno(1,2,3-cd)pyrene         BDL         0.000050         mg/l         8270C-SIM         01/27/12         1           Naphthalene         BDL         0.00025         mg/l         8270C-SIM         01/27/12         1	Benzo(k)fluoranthene	BDL	0.000050	mg/1	8270C-SIM	01/27/12	1
Fluoranthene 0.00013 0.000050 mg/l 8270C-SIM 01/27/12 1 Fluorene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Indeno(1,2,3-cd)pyrene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Naphthalene BDL 0.00025 mg/l 8270C-SIM 01/27/12 1	Chrysene	0.000069	0.000050	mg/l	8270C-SIM	01/27/12	1
Fluorene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Indeno(1,2,3-cd)pyrene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Naphthalene BDL 0.00025 mg/l 8270C-SIM 01/27/12 1	Dibenz(a,h)anthracene	BDL	0.000050	mg/1	8270C-SIM	01/27/12	1
Fluorene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Indeno(1,2,3-cd)pyrene BDL 0.000050 mg/l 8270C-SIM 01/27/12 1 Naphthalene BDL 0.00025 mg/l 8270C-SIM 01/27/12 1	Fluoranthene	0.00013	0.000050	mg/l	8270C-SIM	01/27/12	1
Indeno(1,2,3-cd)pyrene       BDL       0.000050       mg/l       8270C-SIM       01/27/12       1         Naphthalene       BDL       0.00025       mg/l       8270C-SIM       01/27/12       1	Fluorene	BDL					1
Naphthalene BDL 0.00025 mg/l 8270C-SIM 01/27/12 1	Indeno(1,2,3-cd)pyrene	BDL					1
		BDL					1
	Phenanthrene	0.000063	0.000050		8270C-SIM	01/27/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

Project #: 896.16A

ESC Sample # : L557323-04

January 30, 2012

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Site ID : Sample ID : BR-GW-MW-4

Collected By : Tom Weir Collection Date : 01/24/12 09:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Pyrene	0.00012	0.000050	mg/l	8270C-SIM	01/27/12	1
1-Methylnaphthalene	BDL	0.00025	mg/1	8270C-SIM	01/27/12	1
2-Methylnaphthalene	BDL	0.00025	mg/1	8270C-SIM	01/27/12	1
2-Chloronaphthalene	BDL	0.00025	mg/1	8270C-SIM	01/27/12	1
Surrogate Recovery			_			
Nitrobenzene-d5	91.7		% Rec.	8270C-SIM	01/27/12	1
2-Fluorobiphenyl	88.2		% Rec.	8270C-SIM	01/27/12	1
p-Terphenyl-d14	80.6		% Rec.	8270C-SIM	01/27/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 01/30/12 13:50 Printed: 01/30/12 13:51



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557323-05

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Sample ID : BR-GW-MW-5

Collected By : Tom Weir Collection Date : 01/24/12 10:15

Project #: 896.16A

arameter	Result	Det. Limit	Units	Method	Date	Dil.
olatile Organics						
Acetone	BDL	0.050	mq/1	8260B	01/27/12	1
Acrolein	BDL	0.050	mg/l	8260B	01/27/12	1
Acrylonitrile	BDL	0.010	mg/l	8260B	01/27/12	1
Benzene	BDL	0.0010	mg/1	8260B	01/27/12	1
Bromobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromodichloromethane	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromoform	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromomethane	BDL	0.0050	mg/1	8260B	01/27/12	1
n-Butylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
sec-Butylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
tert-Butylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Carbon tetrachloride	BDL	0.0010	mg/l	8260B	01/27/12	1
Chlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Chlorodibromomethane	BDL	0.0010	mg/l	8260B	01/27/12	1
Chloroethane	BDL	0.0050	mg/l	8260B	01/27/12	1
2-Chloroethyl vinyl ether	BDL	0.050	mg/l	8260B	01/27/12	1
Chloroform	BDL	0.0050	mg/l	8260B	01/27/12	1
Chloromethane	BDL	0.0025	mg/l	8260B	01/27/12	1
2-Chlorotoluene	BDL	0.0010	mg/l	8260B	01/27/12	1
4-Chlorotoluene	BDL	0.0010	mq/1	8260B	01/27/12	1
1,2-Dibromo-3-Chloropropane	BDL	0.0050	mg/l	8260B	01/27/12	1
1,2-Dibromoethane	BDL	0.0010	mg/l	8260B	01/27/12	1
Dibromomethane	BDL	0.0010	mq/1	8260B	01/27/12	1
1,2-Dichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,3-Dichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,4-Dichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Dichlorodifluoromethane	BDL	0.0050	mg/l	8260B	01/27/12	1
1,1-Dichloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,2-Dichloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1-Dichloroethene	BDL	0.0010	mg/l	8260B	01/27/12	1
cis-1,2-Dichloroethene	BDL	0.0010	mg/1	8260B	01/27/12	1
trans-1,2-Dichloroethene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,2-Dichloropropane	BDL	0.0010	mg/1	8260B	01/27/12	1
1,1-Dichloropropene	BDL	0.0010	mg/1	8260B	01/27/12	1
1,3-Dichloropropane	BDL	0.0010	mg/1	8260B	01/27/12	ī
cis-1,3-Dichloropropene	BDL	0.0010	mg/1	8260B	01/27/12	1
trans-1,3-Dichloropropene	BDL	0.0010	mg/1	8260B	01/27/12	1
2,2-Dichloropropane	BDL	0.0010	mg/1	8260B	01/27/12	1
Di-isopropyl ether	BDL	0.0010	mg/1	8260B	01/27/12	ī
Ethylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Hexachloro-1,3-butadiene	BDL	0.0010	mg/1	8260B	01/27/12	1
n-Hexane	BDL	0.0010	mg/1	8260B	01/27/12	1
II IICAUIIC	BDL	0.010	mq/1	8260B	01/27/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G

Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557323-05

Project #: 896.16A

Est. 1970

Date Received January 25, 2012 CCLRC Buckeye Road Description :

Sample ID : BR-GW-MW-5

Collected By Tom Weir Collection Date : 01/24/12 10:15

Parameter Result Det. Limit Units Method Date Dil. 0.0010 01/27/12 p-Isopropyltoluene BDL mg/18260B 1 2-Butanone (MEK) Methylene Chloride 0.010 mg/101/27/12 BDL 8260B 1 BDL 0.0050 mg/18260B 01/27/12 1 4-Methyl-2-pentanone (MIBK) 0.010 mg/18260B 01/27/12 1 Methyl tert-butyl ether BDL 0.0010 mg/18260B 01/27/12 1 mg/1Naphthalene BDL 0.0050 8260B 01/27/12 01/27/12 01/27/12 01/27/12 n-Propylbenzene BDL 0.0010 mg/18260B 1 0.0010 Styrene BDT. mg/18260B 1 1,1,1,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane mg/18260B BDL 0.0010 1 0.0010 mg/18260B 01/27/12 BDL 1 Tetrachloroethene mg/101/27/12 BDL 0.0010 8260B Toluene BDL 0.0050 mg/18260B 01/27/12 1,2,3-Trichlorobenzene BDL 0.0010 mg/18260B 01/27/12 1,2,4-Trichlorobenzene BDL 0.0010 mg/18260B 01/27/12 1 1,1,1-Trichloroethane BDL 0.0010 mg/18260B 01/27/12 1 01/27/12 01/27/12 1,1,2-Trichloroethane BDT. 0.0010 mg/18260B 1 0.0010 Trichloroethene BDL mg/18260B 1 mg/1Trichlorofluoromethane 0.0050 8260B 01/27/12 1 BDL 1,2,3-Trichloropropane 0.0025 mg/101/27/12 BDL 8260B 1,2,4-Trimethylbenzene 0.0010 mg/18260B 01/27/12  $\mathtt{BDL}$ ,3,5-Trimethylbenzene BDL 0.0010 mg/18260B 01/27/12 1 Vinyl chloride BDL 0.0010 mg/18260B 01/27/12 Xylenes, Total Surrogate Recovery Toluene-d8 BDL 0.0030 mg/18260B 01/27/12 1 8260B 104. 01/27/12 1 % Rec. Dibromofluoromethane 01/27/12 108. % Rec. 8260B

% Rec.

8260B

Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Acenaphthene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Acenaphthylene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Benzo(a)anthracene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Benzo(a)pyrene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Benzo(b)fluoranthene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Benzo(g,h,i)perylene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Benzo(k)fluoranthene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Chrysene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Dibenz(a,h)anthracene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Fluoranthene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Fluorene	BDL	0.000050	mg/1	8270C-SIM	01/26/12	1
Indeno(1,2,3-cd)pyrene	BDL	0.000050	mg/l	8270C-SIM	01/26/12	1
Naphthalene	BDL	0.00025	mg/1	8270C-SIM	01/26/12	1
Phenanthrene	BDL	0.000050	mg/l	8270C-SIM	01/26/12	1

94.4

BDL - Below Detection Limit

4-Bromofluorobenzene

Det. Limit - Practical Quantitation Limit(PQL)

01/27/12



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557323-05

Project #: 896.16A

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Sample ID : BR-GW-MW-5

Collected By : Tom Weir Collection Date : 01/24/12 10:15

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Pyrene	BDL	0.000050	mq/l	8270C-SIM	01/26/12	1
1-Methylnaphthalene	BDL	0.00025	mq/l	8270C-SIM	01/26/12	ī
2-Methylnaphthalene	BDL	0.00025	mg/1	8270C-SIM	01/26/12	1
2-Chloronaphthalene	BDL	0.00025	mg/l	8270C-SIM	01/26/12	1
Surrogate Recovery			_			
Nitrobenzene-d5	96.5		% Rec.	8270C-SIM	01/26/12	1
2-Fluorobiphenyl	91.4		% Rec.	8270C-SIM	01/26/12	1
p-Terphenyl-d14	78.8		% Rec.	8270C-SIM	01/26/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 01/30/12 13:50 Printed: 01/30/12 13:51



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Est. 1970

Tax I.D. 62-0814289

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557323-06

Project #: 896.16A

Date Received : January 25, 2012 Description : CCLRC Buckeye Road Description

Sample ID : EQP BLANK

Collected By : Tom Weir Collection Date : 01/24/12 00:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Volatile Organics						
Acetone	BDL	0.050	mg/1	8260B	01/27/12	1
Acrolein	BDL	0.050	mg/l	8260B	01/27/12	1
Acrylonitrile	BDL	0.010	mg/l	8260B	01/27/12	1
Benzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromodichloromethane	0.0033	0.0010	mg/l	8260B	01/27/12	1
Bromoform	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromomethane	BDL	0.0050	mg/1	8260B	01/27/12	1
n-Butylbenzene	BDL	0.0010	mq/l	8260B	01/27/12	1
sec-Butylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	ī
tert-Butylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Carbon tetrachloride	BDL	0.0010	mg/l	8260B	01/27/12	1
Chlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Chlorodibromomethane	BDL	0.0010	mg/1	8260B	01/27/12	1
Chloroethane	BDL	0.0010		8260B	01/27/12	1
			mg/1			1
2-Chloroethyl vinyl ether	BDL	0.050	mg/l	8260B	01/27/12	
Chloroform	0.016	0.0050	mg/l	8260B	01/27/12	1
Chloromethane	BDL	0.0025	mg/l	8260B	01/27/12	1
2-Chlorotoluene	BDL	0.0010	mg/l	8260B	01/27/12	1
4-Chlorotoluene	BDL	0.0010	mg/1	8260B	01/27/12	1
1,2-Dibromo-3-Chloropropane	BDL	0.0050	mg/1	8260B	01/27/12	1
1,2-Dibromoethane	BDL	0.0010	mg/1	8260B	01/27/12	1
Dibromomethane	BDL	0.0010	mg/1	8260B	01/27/12	1
1,2-Dichlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12	1
1,3-Dichlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12	1
1,4-Dichlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12	1
Dichlorodifluoromethane	BDL	0.0050	mg/l	8260B	01/27/12	1
1,1-Dichloroethane	BDL	0.0010	mg/1	8260B	01/27/12	1
1,2-Dichloroethane	BDL	0.0010	mg/1	8260B	01/27/12	1
1,1-Dichloroethene	BDL	0.0010	mq/1	8260B	01/27/12	1
cis-1,2-Dichloroethene	BDL	0.0010	mg/l	8260B	01/27/12	1
trans-1,2-Dichloroethene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,2-Dichloropropane	0.0027	0.0010	mg/l	8260B	01/27/12	1
1,1-Dichloropropene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,3-Dichloropropane	BDL	0.0010	mq/1	8260B	01/27/12	1
cis-1,3-Dichloropropene	BDL	0.0010	mq/l	8260B	01/27/12	1
trans-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	01/27/12	1
2,2-Dichloropropane	BDL	0.0010	mg/l	8260B	01/27/12	1
Di-isopropyl ether	BDL	0.0010	mg/1	8260B	01/27/12	1
Ethylbenzene	BDL	0.0010		8260B	01/27/12	1
Etnylbenzene Hexachloro-1,3-butadiene	BDL	0.0010	mg/1	8260B 8260B		1
•			mg/1		01/27/12	_
n-Hexane	BDL	0.010	mg/l	8260B	01/27/12	1
Isopropylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

Project #: 896.16A

ESC Sample # : L557323-06

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Sample ID : EQP BLANK

Collected By : Tom Weir Collection Date : 01/24/12 00:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
p-Isopropyltoluene	BDL	0.0010	mg/l	8260B	01/27/12	1
2-Butanone (MEK)	BDL	0.010	mg/l	8260B	01/27/12	1
Methylene Chloride	BDL	0.0050	mg/l	8260B	01/27/12	1
4-Methyl-2-pentanone (MIBK)	BDL	0.010	mg/l	8260B	01/27/12	1
Methyl tert-butyl ether	BDL	0.0010	mg/1	8260B	01/27/12	1
Naphthalene	BDL	0.0050	mg/l	8260B	01/27/12	1
n-Propylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Styrene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,1,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,2,2-Tetrachloroethane	BDL	0.0010	mq/1	8260B	01/27/12	1
Tetrachloroethene	BDL	0.0010	mg/l	8260B	01/27/12	ī
Toluene	BDL	0.0050	mq/1	8260B	01/27/12	1
1,2,3-Trichlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12	ī
1,2,4-Trichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,1-Trichloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,2-Trichloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
Trichloroethene	BDL	0.0010	mg/1	8260B	01/27/12	1
Trichlorofluoromethane	BDL	0.0010	mg/1	8260B	01/27/12	1
1,2,3-Trichloropropane	BDL	0.0030	mg/1	8260B	01/27/12	1
		0.0025		8260B		1
1,2,4-Trimethylbenzene	BDL		mg/l		01/27/12	1
1,3,5-Trimethylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	
Vinyl chloride	BDL	0.0010	mg/l	8260B	01/27/12	1
Xylenes, Total	BDL	0.0030	mg/l	8260B	01/27/12	1
Surrogate Recovery	106		0 5	00605	01/05/10	-
Toluene-d8	106.		% Rec.	8260B	01/27/12	1
Dibromofluoromethane	108.		% Rec.	8260B	01/27/12	1
4-Bromofluorobenzene	98.1		% Rec.	8260B	01/27/12	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.000050	mg/1	8270C-SIM	01/27/12	1
Acenaphthene	BDL	0.000050	${\tt mg/l}$	8270C-SIM	01/27/12	1
Acenaphthylene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
Benzo(a)anthracene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
Benzo(a)pyrene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
Benzo(b)fluoranthene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
Benzo(g,h,i)perylene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
Benzo(k)fluoranthene	BDL	0.000050	mg/1	8270C-SIM	01/27/12	1
Chrysene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
Dibenz(a,h)anthracene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
Fluoranthene	BDL	0.000050	mg/1	8270C-SIM	01/27/12	1
Fluorene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
Indeno(1,2,3-cd)pyrene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
Naphthalene	BDL	0.00025	mq/1	8270C-SIM	01/27/12	ī
Phenanthrene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

ESC Sample # : L557323-06

January 30, 2012

Site ID :

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Sample ID : EQP BLANK

Project #: 896.16A

Collected By : Tom Weir Collection Date : 01/24/12 00:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Pyrene	BDL	0.000050	mg/l	8270C-SIM	01/27/12	1
1-Methylnaphthalene	BDL	0.00025	mg/l	8270C-SIM	01/27/12	1
2-Methylnaphthalene	BDL	0.00025	mg/1	8270C-SIM	01/27/12	1
2-Chloronaphthalene	BDL	0.00025	mg/1	8270C-SIM	01/27/12	1
Surrogate Recovery						
Nitrobenzene-d5	95.0		% Rec.	8270C-SIM	01/27/12	1
2-Fluorobiphenyl	93.8		% Rec.	8270C-SIM	01/27/12	1
p-Terphenyl-d14	87.6		% Rec.	8270C-SIM	01/27/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 01/30/12 13:50 Printed: 01/30/12 13:51



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557323-07

Project #: 896.16A

Date Received : January 25, 2012 Description : CCLRC Buckeye Road

Description

Sample ID : TRIP BLANK

Collected By : Tom Weir Collection Date : 01/24/12 00:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Volatile Organics						
Acetone	BDL	0.050	mq/1	8260B	01/27/12	1
Acrolein	BDL	0.050	mg/l	8260B	01/27/12	1
Acrylonitrile	BDL	0.010	mg/l	8260B	01/27/12	1
Benzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromodichloromethane	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromoform	BDL	0.0010	mg/l	8260B	01/27/12	1
Bromomethane	BDL	0.0050	mg/l	8260B	01/27/12	1
n-Butylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
sec-Butylbenzene	BDL	0.0010	mg/1	8260B	01/27/12	1
tert-Butylbenzene	BDL	0.0010	mg/1	8260B	01/27/12	1
Carbon tetrachloride	BDL	0.0010	mg/l	8260B	01/27/12	1
Chlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Chlorodibromomethane	BDL	0.0010	mg/1	8260B	01/27/12	1
Chloroethane	BDL	0.0050	mg/l	8260B	01/27/12	1
2-Chloroethyl vinyl ether	BDL	0.050	mg/1	8260B	01/27/12	1
Chloroform	BDL	0.0050	mg/1	8260B	01/27/12	1
Chloromethane	BDL	0.0025	mg/1	8260B	01/27/12	1
2-Chlorotoluene	BDL	0.0010	mg/1	8260B	01/27/12	1
4-Chlorotoluene	BDL	0.0010	mg/1	8260B	01/27/12	1
1,2-Dibromo-3-Chloropropane	BDL	0.0050	mg/1	8260B	01/27/12	1
1,2-Dibromoethane	BDL	0.0010	mg/1	8260B	01/27/12	1
Dibromomethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,2-Dichlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12	1
1,3-Dichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,4-Dichlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12	1
Dichlorodifluoromethane	BDL	0.0050	mg/l	8260B	01/27/12	1
1,1-Dichloroethane	BDL	0.0010	mg/1	8260B	01/27/12	1
1,2-Dichloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1-Dichloroethene	BDL	0.0010	mg/l	8260B	01/27/12	1
cis-1,2-Dichloroethene	BDL	0.0010	mg/l	8260B	01/27/12	1
trans-1,2-Dichloroethene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,2-Dichloropropane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1-Dichloropropene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,3-Dichloropropane	BDL	0.0010	mg/1	8260B	01/27/12	1
cis-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B 8260B	01/27/12	1
trans-1,3-Dichloropropene	BDL	0.0010	mg/1		01/27/12	1
2,2-Dichloropropane	BDL	0.0010 0.0010	mg/l	8260B 8260B	01/27/12	1 1
Di-isopropyl ether	BDL		mg/1		01/27/12	
Ethylbenzene Hexachloro-1,3-butadiene	BDL BDL	0.0010 0.0010	mg/l	8260B 8260B	01/27/12	1 1
		0.0010	mg/l	8260B 8260B	01/27/12	1
n-Hexane Isopropylbenzene	BDL BDL	0.010	mg/l	8260B 8260B	01/27/12	1
reobroblineuseus	חתם	0.0010	mg/1	02000	01/27/12	т

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger

Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557323-07

Date Received : January 25, 2012 Description : CCLRC Buckeye Road Description

: TRIP BLANK Sample ID

Collected By : Tom Weir Collection Date : 01/24/12 00:00

Project #: 896.16A

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
p-Isopropyltoluene	BDL	0.0010	mg/l	8260B	01/27/12	1
2-Butanone (MEK)	BDL	0.010	mg/l	8260B	01/27/12	1
Methylene Chloride	BDL	0.0050	mg/l	8260B	01/27/12	1
4-Methyl-2-pentanone (MIBK)	BDL	0.010	mg/l	8260B	01/27/12	1
Methyl tert-butyl ether	BDL	0.0010	mg/l	8260B	01/27/12	1
Naphthalene	BDL	0.0050	mg/l	8260B	01/27/12	1
n-Propylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
Styrene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,1,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,2,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
Tetrachloroethene	BDL	0.0010	mg/l	8260B	01/27/12	1
Toluene	BDL	0.0050	mg/l	8260B	01/27/12	1
1,2,3-Trichlorobenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,2,4-Trichlorobenzene	BDL	0.0010	mg/1	8260B	01/27/12	1
1,1,1-Trichloroethane	BDL	0.0010	mg/l	8260B	01/27/12	1
1,1,2-Trichloroethane	BDL	0.0010	mg/1	8260B	01/27/12	1
Trichloroethene	BDL	0.0010	mg/l	8260B	01/27/12	1
Trichlorofluoromethane	BDL	0.0050	mg/1	8260B	01/27/12	1
1,2,3-Trichloropropane	BDL	0.0025	mg/1	8260B	01/27/12	1
1,2,4-Trimethylbenzene	BDL	0.0010	mg/l	8260B	01/27/12	1
1,3,5-Trimethylbenzene	BDL	0.0010	mg/1	8260B	01/27/12	1
Vinyl chloride	BDL	0.0010	mg/l	8260B	01/27/12	1
Xylenes, Total	BDL	0.0030	mg/1	8260B	01/27/12	1
Surrogate Recovery						
Toluene-d8	104.		% Rec.	8260B	01/27/12	1
Dibromofluoromethane	108.		% Rec.	8260B	01/27/12	1
4-Bromofluorobenzene	97.4		% Rec.	8260B	01/27/12	1

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 01/30/12 13:50 Printed: 01/30/12 13:51

### Attachment A List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L557323-01	WG575691	SAMP	Naphthalene	R2014712	Е
	WG575691	SAMP	p-Terphenyl-d14	R2014712	J2

## Attachment B Explanation of QC Qualifier Codes

Qualifier	Meaning
E	GTL (EPA) - Greater than upper calibration limit: Actual value is known to be greater than the upper calibration range.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits

### Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

#### Definitions

- Accuracy The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision The agreement between a set of samples or between duplicate samples.

  Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate Organic compounds that are similar in chemical composition, extraction, and chromotography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

## Summary of Remarks For Samples Printed 01/30/12 at 13:51:10

TSR Signing Reports: 134 R5 - Desired TAT

Log As by 6020 for GWs

Sample: L557323-01 Account: PARENVOH Received: 01/25/12 09:00 Due Date: 02/01/12 00:00 RPT Date: 01/30/12 13:50 Sample: L557323-03 Account: PARENVOH Received: 01/25/12 09:00 Due Date: 02/01/12 00:00 RPT Date: 01/30/12 13:50 Sample: L557323-04 Account: PARENVOH Received: 01/25/12 09:00 Due Date: 02/01/12 00:00 RPT Date: 01/30/12 13:50 Sample: L557323-05 Account: PARENVOH Received: 01/25/12 09:00 Due Date: 02/01/12 00:00 RPT Date: 01/30/12 13:50 Sample: L557323-06 Account: PARENVOH Received: 01/25/12 09:00 Due Date: 02/01/12 00:00 RPT Date: 01/30/12 13:50 Sample: L557323-06 Account: PARENVOH Received: 01/25/12 09:00 Due Date: 02/01/12 00:00 RPT Date: 01/30/12 13:50 Sample: L557323-07 Account: PARENVOH Received: 01/25/12 09:00 Due Date: 02/01/12 00:00 RPT Date: 01/30/12 13:50

Partners Env. Co	neultin	Alternate billing information:						Analysis/Container/Preservative						Chain of Custody Page of		
31100 Solon Roa		_   _	Std Quote: PARENVOH040210S					Ì						Prepared by:		
Solon, OH 44139	•													Enviro	ONMENTAL	
001011, 011 44 100	,													SCIENC	CE CORP.	
		Repo	ort to:	Brilline	<u>Б</u>			ĺ						12065 Let	oanon Road	
		Ema	il to: Azzilli Their		artnersen	v.com	a	ļ						Mt. Juliet,	ΓN 37122	
Project C.C. D.C. R.	n		City/Sate Collected (	3 ( )			<b>3</b> ₹							Phone (6	15) 758-5858	
Project Description: CCLRC-By Phone: (440) 248-6005	<u>とくこくこ Ko</u> IClient Project#	200	ESC Key		M 04		\$							Phone (8)	00) 767-5859	
FAX: (440) 248-6005 FAX: (440) 248-6374	896.ic	<b>.</b> A					d							FAX (6	15) 758-5859	
Collected by: Tom Wax	Site/Facility ID#:		P.O.#:				V			İ	•		-	<u> </u>		
Collected by (signature):	Rush? (Lab	MUST Be i	Notified)	Date Resul	lts Needed:		D							CoCode PAREN	OH (lab use only)	l
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12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Al Brillinger Partners Env. Consulting - Solon, OH 31100 Solon Road, Ste. G Solon, OH 44139

## Report Summary

Monday January 30, 2012

Report Number: L557047 Samples Received: 01/24/12 Client Project: 896.16A

Description: 9615 Buckeye Rd.

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

## Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140. NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

 $\overline{\text{Note}}\colon \text{The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.}$ 

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557047-01

Project #: 896.16A

Date Received : January 24, 2012 Description : CCLRC Buckeye Road

SV-1 Sample ID

Collected By : Tom Weir Collection Date : 01/23/12 12:38

Parameter	Cas#	Mol Wgh	t RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatiles in Air for Ohio VAP									
Acetone	67-64-1	58.1	1.25	3.00	16.	38.	8260B	01/25/12	1
Allyl chloride	107-05-1	76.53	0.200	0.630	< 0.20	< 0.63	8260B	01/25/12	1
Benzene	71-43-2	78.1	0.200	0.640	0.72	2.3	8260B	01/25/12	1
Benzyl Chloride	100-44-7	127	0.200	1.00	< 0.20	< 1.0	8260B	01/25/12	1
Bromodichloromethane	75-27-4	164	0.200	1.30	< 0.20	< 1.3	8260B	01/25/12	1
Bromoform	75-25-2	253	0.600	6.20	< 0.60	< 6.2	8260B	01/25/12	1
Bromomethane	74-83-9	94.9	0.200	0.780	< 0.20	< 0.78	8260B	01/25/12	1
Carbon disulfide	75-15-0	76.1	0.200	0.620	< 0.20	< 0.62	8260B	01/25/12	1
Carbon tetrachloride	56-23-5	154	0.200	1.30	< 0.20	< 1.3	8260B	01/25/12	1
Chlorobenzene	108-90-7	113	0.200	0.920	< 0.20	< 0.92	8260B	01/25/12	1
Chloroethane	75-00-3	64.5	0.200	0.530	< 0.20	< 0.53	8260B	01/25/12	1
Chloroform	67-66-3	119	0.200	0.970	< 0.20	< 0.97	8260B	01/25/12	1
Chloromethane	74-87-3	50.5	0.200		< 0.20	< 0.41	8260B	01/25/12	1
2-Chlorotoluene	95-49-8	126		1.00	< 0.20	< 1.0	8260B	01/25/12	1
Dibromochloromethane	124-48-1	208	0.200	1.70	< 0.20	< 1.7	8260B	01/25/12	1
1,2-Dibromoethane	106-93-4	188	0.200	1.50	< 0.20	< 1.5	8260B	01/25/12	ī
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	< 0.20	< 1.2	8260B	01/25/12	1
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	< 0.20	< 1.2	8260B	01/25/12	ī
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	< 0.20	< 1.2	8260B	01/25/12	1
1,2-Dichloroethane	107-06-2	99	0.200		< 0.20	< 0.81	8260B	01/25/12	ī
1,1-Dichloroethane	75-34-3	98	0.200		< 0.20	< 0.80	8260B	01/25/12	1
1,1-Dichloroethene	75-35-4	96.9	0.200		< 0.20	< 0.79	8260B	01/25/12	ī
cis-1,2-Dichloroethene	156-59-2	96.9	0.200		< 0.20	< 0.79	8260B	01/25/12	ī
trans-1,2-Dichloroethene	156-60-5	96.9	0.200		< 0.20	< 0.79	8260B	01/25/12	1
1,2-Dichloropropane	78-87-5	113	0.200		< 0.20	< 0.92	8260B	01/25/12	1
cis-1,3-Dichloropropene	10061-01-5		0.200		< 0.20	< 0.91	8260B	01/25/12	1
trans-1,3-Dichloropropene	10061-02-6		0.200		< 0.20	< 0.91	8260B	01/25/12	ī
1,4-Dioxane	123-91-1	88.1	0.200		< 0.20	< 0.72	8260B	01/25/12	1
Ethanol	64-17-5	46.1		24.0	52.	98.	8260B	01/26/12	20
Ethylbenzene	100-41-4	106	0.200		0.52	2.3	8260B	01/25/12	1
Trichlorofluoromethane	75-69-4	137.4	0.200	1.10	3.0	17.	8260B	01/25/12	1
Dichlorodifluoromethane	75-71-8	120.92		790.	7900	39000	8260B	01/26/12	800
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.70	< 0.63	< 6.7	8260B	01/25/12	1
n-Hexane	110-54-3	86.2	0.200		1.4	4.9	8260B	01/25/12	1
Isopropylbenzene	98-82-8	120.2	0.200		< 0.20	< 0.98	8260B	01/25/12	1
Methylene Chloride	75-09-2	84.9	0.200		0.25	0.87	8260B	01/25/12	1
Methyl Butyl Ketone	591-78-6	100	1.25	5.10	< 1.3	< 5.1	8260B	01/25/12	1
2-Butanone (MEK)	78-93-3	72.1	1.25	3.70	< 1.3	< 3.7	8260B	01/25/12	1
4-Methyl-2-pentanone (MIBK)	108-10-1	100.1	1.25	5.10	< 1.3	< 5.1	8260B	01/25/12	1
Methyl methacrylate	80-62-6		0.200		< 0.20	< 0.82	8260B 8260B	01/25/12	1
MTBE	1634-04-4	88.1	0.200		0.51	1.8	8260B 8260B	01/25/12	1
2-Propanol	67-63-0	60.1	1.25	3.10	5.1	13.	8260B	01/25/12	1
-	100-42-5	104	0.200		< 0.20	< 0.85	8260B 8260B	01/25/12	1
Styrene	100-42-5	104	0.200	0.650	< 0.20	< 0.85	020UB	01/25/12	1

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure
The reported analytical results relate only to the sample submitted.
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Reported: 01/30/12 13:59 Printed: 01/30/12 14:00



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

ESC Sample # : L557047-01

Project # : 896.16A

Date Received : January 24, 2012 Description : CCLRC Buckeye Road

Sample ID

Site ID : SV-1

Collected By : Tom Weir Collection Date : 01/23/12 12:38

Parameter	Cas#	Mol Wgh	t RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.40	< 0.20	< 1.4	8260B	01/25/12	1
Tetrachloroethylene	127-18-4	166	0.200	1.40	0.41	2.8	8260B	01/25/12	1
Toluene	108-88-3	92.1	0.20	0.75	9.7	37.	8260B	01/25/12	1
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.70	< 0.63	< 4.7	8260B	01/25/12	1
1,1,1-Trichloroethane	71-55-6	133	0.200	1.10	< 0.20	< 1.1	8260B	01/25/12	1
1,1,2-Trichloroethane	79-00-5	133	0.200	1.10	< 0.20	< 1.1	8260B	01/25/12	1
Trichloroethylene	79-01-6	131	0.200	1.10	< 0.20	< 1.1	8260B	01/25/12	1
Vinyl acetate	108-05-4	86.1	0.200	0.700	< 0.20	< 0.70	8260B	01/25/12	1
Vinyl chloride	75-01-4	62.5	0.200	0.510	< 0.20	< 0.51	8260B	01/25/12	1
m&p-Xylene	1330-20-7	106	0.400	1.70	1.9	8.2	8260B	01/25/12	1
o-Xylene	95-47-6	106	0.200	0.870	0.68	2.9	8260B	01/25/12	1
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.980	0.70	3.4	8260B	01/25/12	1
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.980	< 0.20	< 0.98	8260B	01/25/12	1
1,4-Bromofluorobenzene	460-00-4				91.98	% Rec.	8260B	01/25/12	1

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure
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Reported: 01/30/12 13:59 Printed: 01/30/12 14:00



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G

Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557047-02

Project # : 896.16A

Date Received : Description : January 24, 2012 CCLRC Buckeye Road

Description

BACKGROUND Sample ID

Collected By : Tom Weir Collection Date : 01/23/12 14:20

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatiles in Air for Ohio VAP									
Acetone	67-64-1	58.1	1.25	3.00	< 1.3	< 3.0	8260B	01/26/12	1
Allyl chloride	107-05-1	76.53	0.200	0.630	< 0.20	< 0.63	8260B	01/26/12	1
Benzene	71-43-2	78.1	0.200	0.640	< 0.20	< 0.64	8260B	01/26/12	1
Benzyl Chloride	100-44-7	127	0.200	1.00	< 0.20	< 1.0	8260B	01/26/12	1
Bromodichloromethane	75-27-4	164	0.200	1.30	< 0.20	< 1.3	8260B	01/26/12	1
Bromoform	75-25-2	253	0.600	6.20	< 0.60	< 6.2	8260B	01/26/12	1
Bromomethane	74-83-9	94.9	0.200	0.780	< 0.20	< 0.78	8260B	01/26/12	1
Carbon disulfide	75-15-0	76.1	0.200	0.620	< 0.20	< 0.62	8260B	01/26/12	1
Carbon tetrachloride	56-23-5	154	0.200	1.30	< 0.20	< 1.3	8260B	01/26/12	1
Chlorobenzene	108-90-7	113	0.200		< 0.20	< 0.92	8260B	01/26/12	1
Chloroethane	75-00-3	64.5	0.200		< 0.20	< 0.53	8260B	01/26/12	1
Chloroform	67-66-3	119	0.200		< 0.20	< 0.97	8260B	01/26/12	ī
Chloromethane	74-87-3	50.5	0.200		0.37	0.76	8260B	01/26/12	1
2-Chlorotoluene	95-49-8	126		1.00	< 0.20	< 1.0	8260B	01/26/12	ī
Dibromochloromethane	124-48-1	208	0.200	1.70	< 0.20	< 1.7	8260B	01/26/12	1
1,2-Dibromoethane	106-93-4	188	0.200	1.50	< 0.20	< 1.5	8260B	01/26/12	ī
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	< 0.20	< 1.2	8260B	01/26/12	1
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	< 0.20	< 1.2	8260B	01/26/12	1
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	< 0.20	< 1.2	8260B	01/26/12	1
1,2-Dichloroethane	107-06-2	99	0.200		< 0.20	< 0.81	8260B	01/26/12	ī
1,1-Dichloroethane	75-34-3	98	0.200		< 0.20	< 0.80	8260B	01/26/12	1
1,1-Dichloroethene	75-35-4	96.9	0.200		< 0.20	< 0.79	8260B	01/26/12	1
cis-1,2-Dichloroethene	156-59-2	96.9	0.200		< 0.20	< 0.79	8260B	01/26/12	1
trans-1,2-Dichloroethene	156-60-5	96.9	0.200		< 0.20	< 0.79	8260B	01/26/12	1
1,2-Dichloropropane	78-87-5	113	0.200		< 0.20	< 0.92	8260B	01/26/12	1
cis-1,3-Dichloropropene	10061-01-5	111	0.200		< 0.20	< 0.91	8260B	01/26/12	1
trans-1,3-Dichloropropene	10061-02-6		0.200		< 0.20	< 0.91	8260B	01/26/12	ī
1,4-Dioxane	123-91-1	88.1	0.200		< 0.20	< 0.72	8260B	01/26/12	1
Ethanol	64-17-5	46.1		1.20	2.9	5.5	8260B	01/26/12	1
Ethylbenzene	100-41-4	106	0.200		< 0.20	< 0.87	8260B	01/26/12	1
Trichlorofluoromethane	75-69-4	137.4		1.10	< 0.20	< 1.1	8260B	01/26/12	ī
Dichlorodifluoromethane	75-71-8		0.200		0.32	1.6	8260B	01/26/12	1
Hexachloro-1,3-butadiene	87-68-3	261		6.70	< 0.63	< 6.7	8260B	01/26/12	1
n-Hexane	110-54-3	86.2	0.200		< 0.20	< 0.71	8260B	01/26/12	1
Isopropylbenzene	98-82-8	120.2	0.200		< 0.20	< 0.71	8260B	01/26/12	1
Methylene Chloride	75-09-2	84.9	0.200		< 0.20	< 0.69	8260B	01/26/12	1
Methyl Butyl Ketone	591-78-6	100	1.25	5.10	< 1.3	< 5.1	8260B	01/26/12	1
2-Butanone (MEK)	78-93-3	72.1	1.25	3.70	< 1.3	< 3.7	8260B	01/26/12	1
4-Methyl-2-pentanone (MIBK)	108-10-1	100.1	1.25	5.10	< 1.3	< 5.1	8260B	01/26/12	1
Methyl methacrylate	80-62-6		0.200		< 0.20	< 0.82	8260B	01/26/12	1
MTBE	1634-04-4	88.1	0.200		< 0.20	< 0.32	8260B	01/26/12	1
2-Propanol	67-63-0	60.1	1.25	3.10	< 1.3	< 3.1	8260B	01/26/12	1
Styrene	100-42-5	104	0.200		< 0.20	< 0.85	8260B	01/26/12	1
DCATCHE	100 47-2	TOT	0.200	0.030	- 0.20	` 0.05	02000	01/20/12	_

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure
The reported analytical results relate only to the sample submitted.
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60. 104

Reported: 01/30/12 13:59 Printed: 01/30/12 14:00



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

January 30, 2012

Site ID :

ESC Sample # : L557047-02

Project # : 896.16A

Date Received : January 24, 2012 Description : CCLRC Buckeye Road

BACKGROUND Sample ID

Collected By : Tom Weir Collection Date : 01/23/12 14:20

Parameter	Cas#	Mol Wgh	t RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.40	< 0.20	< 1.4	8260B	01/26/12	1
Tetrachloroethylene	127-18-4	166	0.200	1.40	< 0.20	< 1.4	8260B	01/26/12	1
Toluene	108-88-3	92.1	0.20	0.75	< 0.20	< 0.75	8260B	01/26/12	1
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.70	< 0.63	< 4.7	8260B	01/26/12	1
1,1,1-Trichloroethane	71-55-6	133	0.200	1.10	< 0.20	< 1.1	8260B	01/26/12	1
1,1,2-Trichloroethane	79-00-5	133	0.200	1.10	< 0.20	< 1.1	8260B	01/26/12	1
Trichloroethylene	79-01-6	131	0.200	1.10	< 0.20	< 1.1	8260B	01/26/12	1
Vinyl acetate	108-05-4	86.1	0.200	0.700	< 0.20	< 0.70	8260B	01/26/12	1
Vinyl chloride	75-01-4	62.5	0.200	0.510	< 0.20	< 0.51	8260B	01/26/12	1
m&p-Xylene	1330-20-7	106	0.400	1.70	< 0.40	< 1.7	8260B	01/26/12	1
o-Xylene	95-47-6	106	0.200	0.870	< 0.20	< 0.87	8260B	01/26/12	1
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.980	< 0.20	< 0.98	8260B	01/26/12	1
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.980	< 0.20	< 0.98	8260B	01/26/12	1
1,4-Bromofluorobenzene	460-00-4				95.84	% Rec.	8260B	01/26/12	1

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure
The reported analytical results relate only to the sample submitted.
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Reported: 01/30/12 13:59 Printed: 01/30/12 14:00

## Summary of Remarks For Samples Printed 01/30/12 at 14:00:15

TSR Signing Reports: 134 R5 - Desired TAT

Log As by 6020 for GWs

Sample: L557047-01 Account: PARENVOH Received: 01/24/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/30/12 13:59

Sample: L557047-02 Account: PARENVOH Received: 01/24/12 09:00 Due Date: 01/31/12 00:00 RPT Date: 01/30/12 13:59

Partners Env. Co	nsultin	1 <b>Q</b> Alte	Alternate billing information:				Analysis/Container/Preservative					Chain of Custody Page of
31100 Solon Roa			td Quote	: PARENV	OH040210	S					Prepared by:	
Solon, OH 44139	-										Envir	ONMENTAL
,		Pana	Report to:							1000	SCIENC	CE CORP.
			<u> </u>	Brillin	har.				25			banon Road
		Email	ABRILLIA	unae @r	artnersen	v.com					Mt. Juliet,	TN 37122
Project Description: CLRC - Buc	KEYE R	<del>1</del> _	City/Sate Collected (	JEVELAN	$\sim OH$			w.i	36.		1	15) 758-5858
Phone: (440) 248-6005	Client Project #:		ESC Key	y:	<del></del>		3		-			300) 767-5859 315) 758-5859
FAX: (440) 248-6374	896.16A				· · · · · · · · · · · · · · · · · · ·		d w	- 14			PAX (0	113) 136-3639
,	Site/Facility ID#		P.O.#:	-			V					ta jetaalis
Collected by (signature):		MUST Be N		Date Resu	ilts Needed:	No.	Ā				CoCode PAREN	VOH (lab use only)
	Nex	t Day	100%	Email?	No_Yes	]				**************************************	Template/Prelogin	
Packed on Ice N Y	IWO	Day	50%	FAX? _	No_Yes	of Cntrs	اكي ا		i i i i i i i i i i i i i i i i i i i		Shipped Via	
Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	Johns	λος			N 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Remarks/Contaminant	Sample # (lab only)
56P-2	GRAS	05	~	2-14-12	مان فا	1	×		111			L560647-01
56P-3		1			14:40	1	*	-#%. <u>.</u>		4 1		n
5 V-1			_		15:44	١			28			B
542	<u> </u>	$\downarrow$		<b>★</b>	14:52	1	<b>X</b>	<b>4</b>		A A		64
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				<u> </u>		ļ	1. X		28	37. 47		
			<del></del>		<u> </u>				1 30		}	
*Matrix: SS - Soil/Solid GW - Groun	dwater WW - V	WasteWater	DW - Drin	king Water (	OT - Other_	71K	<del>_</del> ,	a 32	70	pН	Ter	mp
Remarks:				Λ		504	006	1932	,,	Flow	/Ot	ner
Relinquished by: (Signature)	Date: Z-14-17	Time:		ed by: (Signa	ature Q			Sample 10 FedE	s returned	i via: □UPS rier □	Condition:	(lab use only)
Relinquished by: (Signature)	Date:	Time:		/ed by: (Signa	atura)			Temp:	l	Bottles Recen	red //	je je
Relinquished by: (Signatur)	Date:	Time:	Recei	ived for lab b	y forgnatu	1		Date:		Time:	pH Checked.	NCF.



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Tax I.D. 62-0814289

Est. 1970

Al Brillinger Partners Env. Consulting - Solon, OH 31100 Solon Road, Ste. G Solon, OH 44139

## Report Summary

Monday February 20, 2012

Report Number: L560647
Samples Received: 02/15/12
Client Project: 896.16A

Description: 9615 Buckeye Rd.

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

## Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140. NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

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Tax I.D. 62-0814289

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REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

February 20, 2012

ESC Sample # : L560647-01

Date Received : February 15, 2012 Description : CCLRC-Buckeye Rd

Site ID :

SGP-2 Sample ID

Project # : 896.16A

Collected By Collection Date : 02/14/12 16:06

Parameter	Cas#	Mol Wght	t RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatiles in Air for Ohio VAP									
Acetone	67-64-1	58.1	1.25	3.00	< 1.3	< 3.0	8260B	02/17/12	1
Allyl chloride	107-05-1	76.53	0.200	0.630	< 0.20	< 0.63	8260B	02/17/12	1
Benzene	71-43-2	78.1	0.200	0.640	2.5	8.0	8260B	02/17/12	1
Benzyl Chloride	100-44-7	127	0.200	1.00	< 0.20	< 1.0	8260B	02/17/12	1
Bromodichloromethane	75-27-4	164	0.200	1.30	< 0.20	< 1.3	8260B	02/17/12	1
Bromoform	75-25-2	253	0.600	6.20	< 0.60	< 6.2	8260B	02/17/12	1
Bromomethane	74-83-9	94.9	0.200	0.780	< 0.20	< 0.78	8260B	02/17/12	1
Carbon disulfide	75-15-0	76.1	0.200	0.620	0.73	2.3	8260B	02/17/12	1
Carbon tetrachloride	56-23-5	154	0.200	1.30	< 0.20	< 1.3	8260B	02/17/12	1
Chlorobenzene	108-90-7	113	0.200	0.920	< 0.20	< 0.92	8260B	02/17/12	1
Chloroethane	75-00-3	64.5	0.200	0.530	< 0.20	< 0.53	8260B	02/17/12	1
Chloroform	67-66-3	119	0.200	0.970	< 0.20	< 0.97	8260B	02/17/12	1
Chloromethane	74-87-3	50.5	0.200	0.410	< 0.20	< 0.41	8260B	02/17/12	1
2-Chlorotoluene	95-49-8	126	0.200	1.00	< 0.20	< 1.0	8260B	02/17/12	1
Dibromochloromethane	124-48-1	208	0.200	1.70	< 0.20	< 1.7	8260B	02/17/12	1
1,2-Dibromoethane	106-93-4	188	0.200	1.50	< 0.20	< 1.5	8260B	02/17/12	1
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	< 0.20	< 1.2	8260B	02/17/12	1
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	< 0.20	< 1.2	8260B	02/17/12	1
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	< 0.20	< 1.2	8260B	02/17/12	1
1,2-Dichloroethane	107-06-2	99	0.200	0.810	< 0.20	< 0.81	8260B	02/17/12	1
1,1-Dichloroethane	75-34-3	98	0.200	0.800	< 0.20	< 0.80	8260B	02/17/12	1
1,1-Dichloroethene	75-35-4	96.9	0.200		< 0.20	< 0.79	8260B	02/17/12	1
cis-1,2-Dichloroethene	156-59-2	96.9	0.200		< 0.20	< 0.79	8260B	02/17/12	1
trans-1,2-Dichloroethene	156-60-5	96.9	0.200		< 0.20	< 0.79	8260B	02/17/12	1
1,2-Dichloropropane	78-87-5	113	0.200		< 0.20	< 0.92	8260B	02/17/12	1
cis-1,3-Dichloropropene	10061-01-5		0.200		< 0.20	< 0.91	8260B	02/17/12	1
trans-1,3-Dichloropropene	10061-02-6		0.200		< 0.20	< 0.91	8260B	02/17/12	1
1,4-Dioxane	123-91-1	88.1	0.200		< 0.20	< 0.72	8260B	02/17/12	1
Ethanol	64-17-5	46.1		1.20	72.	140	8260B	02/17/12	1
Ethylbenzene	100-41-4	106	0.200	0.870	0.22	0.95	8260B	02/17/12	1
Trichlorofluoromethane	75-69-4	137.4	0.200	1.10	< 0.20	< 1.1	8260B	02/17/12	1
Dichlorodifluoromethane	75-71-8	120.92			5.8	29.	8260B	02/17/12	1
Hexachloro-1,3-butadiene	87-68-3	261		6.70	< 0.63	< 6.7	8260B	02/17/12	1
n-Hexane	110-54-3	86.2	0.200		3.3	12.	8260B	02/17/12	1
Isopropylbenzene	98-82-8	120.2	0.200		< 0.20	< 0.98	8260B	02/17/12	1
Methylene Chloride	75-09-2	84.9	0.200		< 0.20	< 0.69	8260B	02/17/12	1
Methyl Butyl Ketone	591-78-6	100	1.25	5.10	< 1.3	< 5.1	8260B	02/17/12	1
2-Butanone (MEK)	78-93-3	72.1	1.25	3.70	< 1.3	< 3.7	8260B	02/17/12	1
4-Methyl-2-pentanone (MIBK)	108-10-1	100.1	1.25	5.10	< 1.3	< 5.1	8260B	02/17/12	1
Methyl methacrylate	80-62-6	100.12			< 0.20	< 0.82	8260B	02/17/12	1
MTBE	1634-04-4	88.1	0.200		0.75	2.7	8260B	02/17/12	1
2-Propanol	67-63-0	60.1	1.25	3.10	< 1.3	< 3.1	8260B	02/17/12	1
Styrene	100-42-5	104	0.200	0.850	< 0.20	< 0.85	8260B	02/17/12	1

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure
The reported analytical results relate only to the sample submitted.
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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

February 20, 2012

ESC Sample # : L560647-01

Date Received : February 15, 2012 Description : CCLRC-Buckeye Rd

Site ID :

Sample ID SGP-2 Project # : 896.16A

Collected By

Collection Date : 02/14/12 16:06

Parameter	Cas#	Mol Wgh	t RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.40	< 0.20	< 1.4	8260B	02/17/12	1
Tetrachloroethylene	127-18-4	166	0.200	1.40	0.34	2.3	8260B	02/17/12	1
Toluene	108-88-3	92.1	0.20	0.75	2.8	11.	8260B	02/17/12	1
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.70	< 0.63	< 4.7	8260B	02/17/12	1
1,1,1-Trichloroethane	71-55-6	133	0.200	1.10	0.25	1.4	8260B	02/17/12	1
1,1,2-Trichloroethane	79-00-5	133	0.200	1.10	< 0.20	< 1.1	8260B	02/17/12	1
Trichloroethylene	79-01-6	131	0.200	1.10	< 0.20	< 1.1	8260B	02/17/12	1
Vinyl acetate	108-05-4	86.1	0.200	0.700	< 0.20	< 0.70	8260B	02/17/12	1
Vinyl chloride	75-01-4	62.5	0.200	0.510	< 0.20	< 0.51	8260B	02/17/12	1
m&p-Xylene	1330-20-7	106	0.400	1.70	0.84	3.6	8260B	02/17/12	1
o-Xylene	95-47-6	106	0.200	0.870	0.32	1.4	8260B	02/17/12	1
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.980	0.33	1.6	8260B	02/17/12	1
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.980	< 0.20	< 0.98	8260B	02/17/12	1
1,4-Bromofluorobenzene	460-00-4				92.06	% Rec.	8260B	02/17/12	1

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure
The reported analytical results relate only to the sample submitted.
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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

February 20, 2012

ESC Sample # : L560647-02

Date Received : February 15, 2012 Description : CCLRC-Buckeye Rd

SGP-3 Sample ID

Collected By Collection Date : 02/14/12 14:40 Project #: 896.16A

Site ID :

Parameter	Cas# 1	Mol Wgh	t RDL1 RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatiles in Air for Ohio VAP								
Acetone	67-64-1	58.1	1.25 3.00	3.4	8.1	8260B	02/16/12	1
Allyl chloride	107-05-1	76.53	0.200 0.630	< 0.20	< 0.63	8260B	02/16/12	1
Benzene	71-43-2	78.1	0.200 0.640	0.82	2.6	8260B	02/16/12	1
Benzyl Chloride	100-44-7	127	0.200 1.00	< 0.20	< 1.0	8260B	02/16/12	1
Bromodichloromethane	75-27-4	164	0.200 1.30	< 0.20	< 1.3	8260B	02/16/12	1
Bromoform	75-25-2	253	0.600 6.20	< 0.60	< 6.2	8260B	02/16/12	1
Bromomethane	74-83-9	94.9	0.200 0.780	< 0.20	< 0.78	8260B	02/16/12	1
Carbon disulfide	75-15-0	76.1	0.200 0.620	2.0	6.2	8260B	02/16/12	1
Carbon tetrachloride	56-23-5	154	0.200 1.30	< 0.20	< 1.3	8260B	02/16/12	1
Chlorobenzene	108-90-7	113	0.200 0.920	< 0.20	< 0.92	8260B	02/16/12	1
Chloroethane	75-00-3	64.5	0.200 0.530	< 0.20	< 0.53	8260B	02/16/12	1
Chloroform	67-66-3	119	0.200 0.970	< 0.20	< 0.97	8260B	02/16/12	1
Chloromethane	74-87-3	50.5	0.200 0.410	< 0.20	< 0.41	8260B	02/16/12	1
2-Chlorotoluene	95-49-8	126	0.200 1.00	< 0.20	< 1.0	8260B	02/16/12	1
Dibromochloromethane	124-48-1	208	0.200 1.70	< 0.20	< 1.7	8260B	02/16/12	1
1,2-Dibromoethane	106-93-4	188	0.200 1.50	< 0.20	< 1.5	8260B	02/16/12	1
1,2-Dichlorobenzene	95-50-1	147	0.200 1.20	< 0.20	< 1.2	8260B	02/16/12	1
1,3-Dichlorobenzene	541-73-1	147	0.200 1.20	< 0.20	< 1.2	8260B	02/16/12	1
1,4-Dichlorobenzene	106-46-7	147	0.200 1.20	< 0.20	< 1.2	8260B	02/16/12	1
1,2-Dichloroethane	107-06-2	99	0.200 0.810	< 0.20	< 0.81	8260B	02/16/12	1
1,1-Dichloroethane	75-34-3	98	0.200 0.800	< 0.20	< 0.80	8260B	02/16/12	1
1,1-Dichloroethene	75-35-4	96.9	0.200 0.790	< 0.20	< 0.79	8260B	02/16/12	1
cis-1,2-Dichloroethene	156-59-2	96.9	0.200 0.790	< 0.20	< 0.79	8260B	02/16/12	1
trans-1,2-Dichloroethene	156-60-5	96.9	0.200 0.790	< 0.20	< 0.79	8260B	02/16/12	1
1,2-Dichloropropane	78-87-5	113	0.200 0.920	< 0.20	< 0.92	8260B	02/16/12	1
cis-1,3-Dichloropropene	10061-01-5	111	0.200 0.910	< 0.20	< 0.91	8260B	02/16/12	1
trans-1,3-Dichloropropene	10061-02-6	111	0.200 0.910	< 0.20	< 0.91	8260B	02/16/12	1
1,4-Dioxane	123-91-1	88.1	0.200 0.720	< 0.20	< 0.72	8260B	02/16/12	1
Ethanol	64-17-5	46.1	0.630 1.20	81.	150	8260B	02/16/12	1
Ethylbenzene	100-41-4	106	0.200 0.870	< 0.20	<_0.87	8260B	02/16/12	1
Trichlorofluoromethane	75-69-4	137.4	0.200 1.10	0.89	5.0	8260B	02/16/12	1
Dichlorodifluoromethane	75-71-8		0.200 0.990	15.	74	8260B	02/16/12	1
Hexachloro-1,3-butadiene	87-68-3	261	0.630 6.70	< 0.63	< 6.7	8260B	02/16/12	1
n-Hexane	110-54-3	86.2	0.200 0.710	8.5	30.	8260B	02/16/12	1
Isopropylbenzene	98-82-8	120.2	0.200 0.980	< 0.20	< 0.98	8260B	02/16/12	1
Methylene Chloride	75-09-2	84.9	0.200 0.690	0.41	1.4	8260B	02/16/12	1
Methyl Butyl Ketone	591-78-6	100	1.25 5.10	< 1.3	< 5.1	8260B	02/16/12	1
2-Butanone (MEK)	78-93-3	72.1	1.25 3.70	< 1.3	< 3.7	8260B	02/16/12	1
4-Methyl-2-pentanone (MIBK)	108-10-1	100.1	1.25 5.10	< 1.3	< 5.1	8260B	02/16/12	1
Methyl methacrylate	80-62-6		0.200 0.820	< 0.20	< 0.82	8260B	02/16/12	1
MTBE	1634-04-4	88.1	0.200 0.720	< 0.20	< 0.72	8260B	02/16/12	1
2-Propanol	67-63-0	60.1	1.25 3.10	22.	54.	8260B	02/16/12	1
Styrene	100-42-5	104	0.200 0.850	< 0.20	< 0.85	8260B	02/16/12	1

RDL1 = ppbv , RDL2 = ug/m3

Note:

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

February 20, 2012

ESC Sample # : L560647-02

Date Received : February 15, 2012 Description : CCLRC-Buckeye Rd

Site ID :

Sample ID SGP-3

Project #: 896.16A

Collected By

Collection Date : 02/14/12 14:40

Parameter	Cas#	Mol Wgh	t RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.40	< 0.20	< 1.4	8260B	02/16/12	1
Tetrachloroethylene	127-18-4	166	0.200	1.40	< 0.20	< 1.4	8260B	02/16/12	1
Toluene	108-88-3	92.1	0.20	0.75	2.0	7.5	8260B	02/16/12	1
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.70	< 0.63	< 4.7	8260B	02/16/12	1
1,1,1-Trichloroethane	71-55-6	133	0.200	1.10	< 0.20	< 1.1	8260B	02/16/12	1
1,1,2-Trichloroethane	79-00-5	133	0.200	1.10	< 0.20	< 1.1	8260B	02/16/12	1
Trichloroethylene	79-01-6	131	0.200	1.10	< 0.20	< 1.1	8260B	02/16/12	1
Vinyl acetate	108-05-4	86.1	0.200	0.700	0.29	1.0	8260B	02/16/12	1
Vinyl chloride	75-01-4	62.5	0.200	0.510	< 0.20	< 0.51	8260B	02/16/12	1
m&p-Xylene	1330-20-7	106	0.400	1.70	0.70	3.0	8260B	02/16/12	1
o-Xylene	95-47-6	106	0.200	0.870	0.24	1.0	8260B	02/16/12	1
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.980	< 0.20	< 0.98	8260B	02/16/12	1
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.980	< 0.20	< 0.98	8260B	02/16/12	1
1,4-Bromofluorobenzene	460-00-4				90.21	% Rec.	8260B	02/16/12	1

RDL1 = ppbv , RDL2 = ug/m3

Note:

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

February 20, 2012

Site ID :

ESC Sample # : L560647-03

Date Received : February 15, 2012 Description : CCLRC-Buckeye Rd

SV-1 Sample ID

Collected By

Collection Date : 02/14/12 15:44

Project # : 896.16A

Parameter	Cas#	Mol Wgh	t RDL1 I	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatiles in Air for Ohio VAP									
Acetone	67-64-1	58.1	1.25	3.00	1.6	3.8	8260B	02/16/12	1
Allyl chloride	107-05-1	76.53	0.200 0	.630	< 0.20	< 0.63	8260B	02/16/12	1
Benzene	71-43-2	78.1	0.200 0	.640	0.52	1.7	8260B	02/16/12	1
Benzyl Chloride	100-44-7	127		1.00	< 0.20	< 1.0	8260B	02/16/12	1
Bromodichloromethane	75-27-4	164	0.200	1.30	< 0.20	< 1.3	8260B	02/16/12	1
Bromoform	75-25-2	253	0.600	6.20	< 0.60	< 6.2	8260B	02/16/12	1
Bromomethane	74-83-9	94.9	0.200 0	.780	< 0.20	< 0.78	8260B	02/16/12	1
Carbon disulfide	75-15-0	76.1	0.200 0	.620	< 0.20	< 0.62	8260B	02/16/12	1
Carbon tetrachloride	56-23-5	154	0.200	1.30	< 0.20	< 1.3	8260B	02/16/12	1
Chlorobenzene	108-90-7	113	0.200 0	.920	< 0.20	< 0.92	8260B	02/16/12	1
Chloroethane	75-00-3	64.5	0.200 0	.530	< 0.20	< 0.53	8260B	02/16/12	1
Chloroform	67-66-3	119	0.200 0	.970	< 0.20	< 0.97	8260B	02/16/12	1
Chloromethane	74-87-3	50.5	0.200 0	.410	< 0.20	< 0.41	8260B	02/16/12	1
2-Chlorotoluene	95-49-8	126	0.200	1.00	< 0.20	< 1.0	8260B	02/16/12	1
Dibromochloromethane	124-48-1	208		1.70	< 0.20	< 1.7	8260B	02/16/12	1
1,2-Dibromoethane	106-93-4	188	0.200	1.50	< 0.20	< 1.5	8260B	02/16/12	1
1,2-Dichlorobenzene	95-50-1	147		1.20	< 0.20	< 1.2	8260B	02/16/12	1
1,3-Dichlorobenzene	541-73-1	147		1.20	0.22	1.3	8260B	02/16/12	1
1,4-Dichlorobenzene	106-46-7	147		1.20	< 0.20	< 1.2	8260B	02/16/12	1
1,2-Dichloroethane	107-06-2	99	0.200 0		< 0.20	< 0.81	8260B	02/16/12	1
1,1-Dichloroethane	75-34-3	98	0.200 0		< 0.20	< 0.80	8260B	02/16/12	1
1,1-Dichloroethene	75-35-4	96.9	0.200 0		< 0.20	< 0.79	8260B	02/16/12	1
cis-1,2-Dichloroethene	156-59-2	96.9	0.200 0		< 0.20	< 0.79	8260B	02/16/12	1
trans-1,2-Dichloroethene	156-60-5	96.9	0.200 0		< 0.20	< 0.79	8260B	02/16/12	1
1,2-Dichloropropane	78-87-5	113	0.200 0		< 0.20	< 0.92	8260B	02/16/12	1
cis-1,3-Dichloropropene	10061-01-5		0.200 0		< 0.20	< 0.91	8260B	02/16/12	1
trans-1,3-Dichloropropene	10061-02-6		0.200 0		< 0.20	< 0.91	8260B	02/16/12	1
1,4-Dioxane	123-91-1	88.1	0.200 0		< 0.20	< 0.72	8260B	02/16/12	1
Ethanol	64-17-5	46.1		120.	590	1100	8260B	02/17/12	100
Ethylbenzene	100-41-4	106	0.200 0		< 0.20	< 0.87	8260B	02/16/12	1
Trichlorofluoromethane	75-69-4	137.4		1.10	0.69	3.9	8260B	02/16/12	1
Dichlorodifluoromethane	75-71-8	120.92		99.0	3200	16000	8260B	02/17/12	100
Hexachloro-1,3-butadiene	87-68-3	261		6.70	< 0.63	< 6.7	8260B	02/16/12	1
n-Hexane	110-54-3	86.2	0.200 0		0.70	2.5	8260B	02/16/12	1
Isopropylbenzene	98-82-8	120.2	0.200 0		< 0.20	< 0.98	8260B	02/16/12	1
Methylene Chloride	75-09-2	84.9	0.200 0		0.22	0.76	8260B	02/16/12	1
Methyl Butyl Ketone	591-78-6	100		5.10	< 1.3	< 5.1	8260B	02/16/12	1
2-Butanone (MEK)	78-93-3	72.1		3.70	< 1.3	< 3.7	8260B	02/16/12	1
4-Methyl-2-pentanone (MIBK)	108-10-1	100.1		5.10	< 1.3	< 5.1	8260B	02/16/12	1
Methyl methacrylate	80-62-6		0.200 0		< 0.20	< 0.82	8260B	02/16/12	1
MTBE	1634-04-4	88.1	0.200 0		< 0.20	< 0.72	8260B	02/16/12	1
2-Propanol	67-63-0	60.1		31.0	73.	180	8260B	02/17/12	10
Styrene	100-42-5	104	0.200 0	.850	< 0.20	< 0.85	8260B	02/16/12	1

RDL1 = ppbv , RDL2 = ug/m3

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

February 20, 2012

ESC Sample # : L560647-03

Date Received : February 15, 2012 Description : CCLRC-Buckeye Rd

Site ID :

Sample ID SV-1

Project #: 896.16A

Collected By Collection Date : 02/14/12 15:44

Parameter	Cas#	Mol Wgh	t RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.40	< 0.20	< 1.4	8260B	02/16/12	1
Tetrachloroethylene	127-18-4	166	0.200	1.40	< 0.20	< 1.4	8260B	02/16/12	1
Toluene	108-88-3	92.1	0.20	0.75	2.2	8.3	8260B	02/16/12	1
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.70	< 0.63	< 4.7	8260B	02/16/12	1
1,1,1-Trichloroethane	71-55-6	133	0.200	1.10	< 0.20	< 1.1	8260B	02/16/12	1
1,1,2-Trichloroethane	79-00-5	133	0.200	1.10	< 0.20	< 1.1	8260B	02/16/12	1
Trichloroethylene	79-01-6	131	0.200	1.10	< 0.20	< 1.1	8260B	02/16/12	1
Vinyl acetate	108-05-4	86.1	0.200	0.700	0.36	1.3	8260B	02/16/12	1
Vinyl chloride	75-01-4	62.5	0.200	0.510	< 0.20	< 0.51	8260B	02/16/12	1
m&p-Xylene	1330-20-7	106	0.400	1.70	0.76	3.3	8260B	02/16/12	1
o-Xylene	95-47-6	106	0.200	0.870	0.26	1.1	8260B	02/16/12	1
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.980	< 0.20	< 0.98	8260B	02/16/12	1
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.980	< 0.20	< 0.98	8260B	02/16/12	1
1,4-Bromofluorobenzene	460-00-4				89.26	% Rec.	8260B	02/16/12	1

RDL1 = ppbv , RDL2 = ug/m3

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REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

February 20, 2012

ESC Sample # : L560647-04

Date Received : February 15, 2012 Description : CCLRC-Buckeye Rd

Site ID :

SV-2 Sample ID

Project #: 896.16A

Collected By

Collection Date : 02/14/12 14:52

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatiles in Air for Ohio VAP									
Acetone	67-64-1	58.1	1.25		1.5	3.6	8260B	02/16/12	1
Allyl chloride	107-05-1	76.53	0.200 (	0.630	< 0.20	< 0.63	8260B	02/16/12	1
Benzene	71-43-2	78.1	0.200 (	0.640	0.28	0.89	8260B	02/16/12	1
Benzyl Chloride	100-44-7	127	0.200	1.00	< 0.20	< 1.0	8260B	02/16/12	1
Bromodichloromethane	75-27-4	164	0.200	1.30	< 0.20	< 1.3	8260B	02/16/12	1
Bromoform	75-25-2	253	0.600	6.20	< 0.60	< 6.2	8260B	02/16/12	1
Bromomethane	74-83-9	94.9	0.200 (	0.780	< 0.20	< 0.78	8260B	02/16/12	1
Carbon disulfide	75-15-0	76.1	0.200 (	0.620	< 0.20	< 0.62	8260B	02/16/12	1
Carbon tetrachloride	56-23-5	154	0.200	1.30	< 0.20	< 1.3	8260B	02/16/12	1
Chlorobenzene	108-90-7	113	0.200 (	0.920	< 0.20	< 0.92	8260B	02/16/12	1
Chloroethane	75-00-3	64.5	0.200 (	0.530	< 0.20	< 0.53	8260B	02/16/12	1
Chloroform	67-66-3	119	0.200 (	0.970	< 0.20	< 0.97	8260B	02/16/12	1
Chloromethane	74-87-3	50.5	0.200 (	0.410	< 0.20	< 0.41	8260B	02/16/12	1
2-Chlorotoluene	95-49-8	126	0.200	1.00	< 0.20	< 1.0	8260B	02/16/12	1
Dibromochloromethane	124-48-1	208	0.200	1.70	< 0.20	< 1.7	8260B	02/16/12	1
1,2-Dibromoethane	106-93-4	188	0.200	1.50	< 0.20	< 1.5	8260B	02/16/12	1
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	< 0.20	< 1.2	8260B	02/16/12	1
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	< 0.20	< 1.2	8260B	02/16/12	1
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	< 0.20	< 1.2	8260B	02/16/12	
1,2-Dichloroethane	107-06-2	99	0.200 (	0.810	< 0.20	< 0.81	8260B	02/16/12	1
1,1-Dichloroethane	75-34-3	98	0.200 (	0.800	< 0.20	< 0.80	8260B	02/16/12	1
1,1-Dichloroethene	75-35-4	96.9	0.200 (	0.790	< 0.20	< 0.79	8260B	02/16/12	1
cis-1,2-Dichloroethene	156-59-2	96.9	0.200		< 0.20	< 0.79	8260B	02/16/12	1
trans-1,2-Dichloroethene	156-60-5	96.9	0.200		< 0.20	< 0.79	8260B	02/16/12	
1,2-Dichloropropane	78-87-5	113	0.200	0.920	< 0.20	< 0.92	8260B	02/16/12	1
cis-1,3-Dichloropropene	10061-01-5		0.200		< 0.20	< 0.91	8260B	02/16/12	
trans-1,3-Dichloropropene	10061-02-6		0.200	0.910	< 0.20	< 0.91	8260B	02/16/12	1
1,4-Dioxane	123-91-1	88.1	0.200 (		< 0.20	< 0.72	8260B	02/16/12	1
Ethanol	64-17-5	46.1		48.0	290	550	8260B	02/17/12	40
Ethylbenzene	100-41-4	106	0.200		< 0.20	< 0.87	8260B	02/16/12	1
Trichlorofluoromethane	75-69-4		0.200	1.10	< 0.20	< 1.1	8260B	02/16/12	1
Dichlorodifluoromethane	75-71-8	120.92	8.00	40.0	1300	6400	8260B	02/17/12	40
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.70	< 0.63	< 6.7	8260B	02/16/12	1
n-Hexane	110-54-3		0.200		0.48	1.7	8260B	02/16/12	
Isopropylbenzene	98-82-8		0.200		< 0.20	< 0.98	8260B	02/16/12	1
Methylene Chloride	75-09-2	84.9	0.200		< 0.20	< 0.69	8260B	02/16/12	1
Methyl Butyl Ketone	591-78-6	100	1.25	5.10	< 1.3	< 5.1	8260B	02/16/12	1
2-Butanone (MEK)	78-93-3	72.1	1.25	3.70	< 1.3	< 3.7	8260B	02/16/12	
4-Methyl-2-pentanone (MIBK)	108-10-1	100.1	1.25	5.10	< 1.3	< 5.1	8260B	02/16/12	1
Methyl methacrylate	80-62-6	100.12			< 0.20	< 0.82	8260B	02/16/12	1
MTBE	1634-04-4	88.1	0.200		< 0.20	< 0.72	8260B	02/16/12	1
2-Propanol	67-63-0	60.1		3.10	15.	37.	8260B	02/16/12	1
Styrene	100-42-5	104	0.200	0.850	< 0.20	< 0.85	8260B	02/16/12	1

RDL1 = ppbv , RDL2 = ug/m3

Note:

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Al Brillinger Partners Env. Consulting - Solon, O 31100 Solon Road, Ste. G Solon, OH 44139

February 20, 2012

ESC Sample # : L560647-04

Date Received : February 15, 2012 Description : CCLRC-Buckeye Rd

Site ID :

Sample ID SV-2

Project #: 896.16A

Collected By

Collection Date : 02/14/12 14:52

Parameter	Cas#	Mol Wgh	t RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.40	< 0.20	< 1.4	8260B	02/16/12	1
Tetrachloroethylene	127-18-4	166	0.200	1.40	< 0.20	< 1.4	8260B	02/16/12	1
Toluene	108-88-3	92.1	0.20	0.75	1.0	3.8	8260B	02/16/12	1
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.70	< 0.63	< 4.7	8260B	02/16/12	1
1,1,1-Trichloroethane	71-55-6	133	0.200	1.10	< 0.20	< 1.1	8260B	02/16/12	1
1,1,2-Trichloroethane	79-00-5	133	0.200	1.10	< 0.20	< 1.1	8260B	02/16/12	1
Trichloroethylene	79-01-6	131	0.200	1.10	< 0.20	< 1.1	8260B	02/16/12	1
Vinyl acetate	108-05-4	86.1	0.200	0.700	< 0.20	< 0.70	8260B	02/16/12	1
Vinyl chloride	75-01-4	62.5	0.200	0.510	< 0.20	< 0.51	8260B	02/16/12	1
m&p-Xylene	1330-20-7	106	0.400	1.70	< 0.40	< 1.7	8260B	02/16/12	1
o-Xylene	95-47-6	106	0.200	0.870	< 0.20	< 0.87	8260B	02/16/12	1
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.980	< 0.20	< 0.98	8260B	02/16/12	1
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.980	< 0.20	< 0.98	8260B	02/16/12	1
1,4-Bromofluorobenzene	460-00-4				91.5	% Rec.	8260B	02/16/12	1

RDL1 = ppbv , RDL2 = ug/m3

Note:

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### Attachment A List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L560647-01	WG579051	SAMP	Ethanol	R2041312	J4E
L560647-02	WG578837	SAMP	Ethanol	R2039534	E
	WG578837	SAMP	2-Propanol	R2039534	E
L560647-03	WG579051	SAMP	Ethanol	R2041312	Ј4
	WG579051	SAMP	Dichlorodifluoromethane	R2041312	Е
L560647-04	WG579051	SAMP	Ethanol	R2041312	Ј4
	WG579051	SAMP	Dichlorodifluoromethane	R2041312	Е

## Attachment B Explanation of QC Qualifier Codes

Qualifier	Meaning
E	GTL (EPA) - Greater than upper calibration limit: Actual value is known to be greater than the upper calibration range.
J4	The associated batch QC was outside the established quality control range for accuracy.

### Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

#### Definitions

- Accuracy The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision The agreement between a set of samples or between duplicate samples.

  Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate Organic compounds that are similar in chemical composition, extraction, and chromotography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

## Summary of Remarks For Samples Printed 02/20/12 at 12:05:53

TSR Signing Reports: 134 R5 - Desired TAT

Log As by 6020 for GWs

Sample: L560647-01 Account: PARENVOH Received: 02/15/12 09:00 Due Date: 02/22/12 00:00 RPT Date: 02/20/12 12:05 Sample: L560647-01 Account: PARENVOH Received: 02/13/12 09:00 Due Date: 02/22/12 00:00 RPT Date: 02/20/12 12:05 QC2VAP
Sample: L560647-02 Account: PARENVOH Received: 02/15/12 09:00 Due Date: 02/22/12 00:00 RPT Date: 02/20/12 12:05 QC2VAP
Sample: L560647-03 Account: PARENVOH Received: 02/15/12 09:00 Due Date: 02/22/12 00:00 RPT Date: 02/20/12 12:05

QC2VAP

Sample: L560647-04 Account: PARENVOH Received: 02/15/12 09:00 Due Date: 02/22/12 00:00 RPT Date: 02/20/12 12:05

QC2VAP

## APPENDIX E MONITOR WELL SAMPLING FORMS

## PARTNERS ENVIRONMENTAL CONSULTING, INC.

## MONITORING WELL SAMPLING FORM



Monitoring	Well ID:	NW-1		Date:	1/23/12	Start Ti	me:	Field	TAW
Weather C						End Tin	ne:	Personnel	
Comments									
	2.			IN	ITIAL MEASUR	EMENTS			
Measured \	Well Bottom	n (ft) 10.5	37)			Well Ca	asing Diameter	: \"	
Measured I	Depth to Wa		U1			Conver	sion Factor (ga	I/lineal foot)	
Calculated	Water Colu		19			1.25" =		2" = 0.17	3" = 0.38
One Well V	olume (gal)	0.01	Three W	ell Volume	es (gal)	4" = 0.6	36	6" = 1.50	8" = 2.60
Notes: Mea	surements		Casing (TOC	)					2.30
					WELL CONDIT	TIONS			
Casing Cor	ndition	<b>◎</b>	Not OK		Cap Condition	on	Øk	Not OK	Well Riser
Paint Cond	ition	(OTO)	Not OK	•	Lock Conditi	on	<b>N</b> OK	Not OK	Stainless Steel
Inner Casir	ng Condition	ı (ÖK)	Not OK		Surface Sea	I Condition	``@	Not OK	Steel
Notes:							•		Ю́с
			DEVElor	rant/ F	PURGE INFORM	MATION			
Purge Met	hod		Steel Bailer		Peristaltic Pur	•	Grundfos	s Pump Oth	ner:
		Teflon Ba	iler		Polyethylene	Bailer	Bladder	Pump	
Time	Gallons Purged	Flow Rate (ml/min)	Temperature (°C)	PH (S.U.)	Specific Conductivity (mhos)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	ORP	Comments
	- NN Wa	REINI	ents sue	دسدا		***			
		200	20-2	0N/m -	20-				
			-	Cior	1110				
							-		
				***					
	· · · · · · ·								
						777-			
									-
-									
C	41 1	0	0/ 1= ::	SA	MPLING INFOR				
Sample Me	ethod	Stainless Teflon Ba	Steel Bailer iler		Peristaltic Pur Polyethylene I	•	Grundfos Bladder I	•	ner:
Comments:					$\overline{}$				
	Vo	24/12	9:45	qu-					,
Sample Co		Numb	per of Containe	ers:		ds/Analyte C	Groups:	Preservative:	Filter (y/n)
40	^		۲		#1			HCI	
40	ml .		2		P	4H			_
Sampler (P	rint Name)	10	m 05	<u> </u>	Sampler's Sig	nature 📉	That!		



Monitorin	g Well ID:	MW-Z		Date:	1/23/12	Start	Time:		
Weather	Conditions:	1190			1/63/12	End 7		Fie Perso	
Commen	ts:			<del></del>		Liiu	ime.	1 6150	iniei
				11	NITIAL MEASU	DEMENTO			
Measured	Well Botto	m (ft) 11	95		WITHAL WIEASU				
	Depth to V	11,					Casing Diamete		
	d Water Col		,47				ersion Factor (g	al/lineal foot)	
	Volume (ga		48			1.25"	= 0.08	2" = 0.	17 3" = 0.38
			hree V	Vell Volum	es (gal)	4" = 0	0.66	6" = 1.5	8" = 2.60
riolos, Ivie	asulement	s nom rop c	of Casing (TOC	;)					
	<del></del>				WELL COND	ITIONS			
Casing Co		Øk	Not Of	(	Cap Condit	ion	Øx	Not Ok	Well Riser
Paint Con		$ ot\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!$	Not Of	(	Lock Condi	tion	NA OK	Not Ok	1
	ing Conditio	n OF	Not Oh	(	Surface Se	al Condition	(A)	Not Ok	0141111000 01001
Notes:								1101 01	DVC
			DEVELOP	must 1	PURGE INFORI	MATION			
Purge Me	thod	Stainless	Steel Bailer	1400					
		Teflon Ba			Peristaltic Pu Polyethylene	•	Grundfo	•	Other:
				<u> </u>		Baller	Bladder	Pump	
Time	Gallons Purged	Flow Rate (ml/min)	Temperature	PH	Specific Conductivity	Turbidity	Dissolved	000	
	- urgeu	(1110/11111)	(°C)	(S.U.)	(mhos)	(NTUs)	Oxygen (mg/L)	ORP	Comments
	TNO ME	ASUREN	WAS MY				, , , ,		
	- AB/E	TO NEV	EADLENA	そしょうが	21 ->	DRM			
					~	264			
							<del></del>		
								<u> </u>	
							-		
							-		
									·
<del></del>						···			
amala ##	4l '			SAI	MPLING INFOR	MATION			
Sample Me	tnod		Steel Bailer		Peristaltic Pum	np	Grundfos	Pump (	Other:
		Teflon Bai	ler		Polyethylene B	Bailer	Bladder P		
Comments:		, , , , , , , , , , , , , , , , , , , ,					<u> </u>	•	
	V	24/12	9:2	5m					
ample Con	ntainers	Numbe	er of Container	s:	Test Method	ds/Analyte G	Touns:	Preservative:	F" ( )
40 m			2		104		apo.		Filter (y/n)
40~			2		7.4.			401	
					NA	<del></del>			
		·							
ampler (Pri	int Name)								
	···· Hallic)		IOM WS	R	Sampler's Sign	ature (	tour hi		



Monitorin	g Well ID:	MW-3		Date	1/2/-	Stort T	·	<del></del>	
Weather	Conditions:	1.10		Date	10315	Start T		Field	
Comment	ts:					End Ti	me:	Persor	inel
				1	MITIAL BETAOLI				
Measured	Well Botto	om (ff)		1.	NITIAL MEASU	<del></del>			
	Depth to V		1.7 <u>3</u>				asing Diamete		
	d Water Co	1 (5)	.19				rsion Factor (g	al/lineal foot)	,
	Volume (ga	, ,	V-lot			1.25" =		2" = 0.1	7 3" = 0.38
			of Casing (TOC	/ell Volum	ies (gal)	4" = 0.6	66	6" = 1.50	0 8" = 2.60
110100.1110	asurement	s nom rop (	of Casing (100	·)					
0					WELL COND	ITIONS			
Casing Co		Ø₹	Not Ok	(	Cap Condit	ion	ØK	Not OK	Well Riser
Paint Cond		₫.	Not Ok	(	Lock Condi	tion	OK OK	Not OK	11011111001
	ng Conditio	on QK	Not OK		Surface Se	al Condition		Not OK	0141111000 01001
Notes:									<del>P</del> VC
							-		
			ALVIGO	mars-1	PURGE INFORI	MATION		· · · · · · · · · · · · · · · · · · ·	
Purge Met	hod	Stainless	Steel Bailer		Peristaltic Pu		O If		
		Teflon Ba			Polyethylene	•	Grundfos	· •	Other:
	Gallons	Flow Pote			Specific	Dallel	Bladder	Pump	
Time	Purged	Flow Rate (ml/min)	Temperature (°C)	PH (S.U.)	Conductivity	Turbidity	Dissolved Oxygen	ORP	0.000
				(0.0.)	(mhos)	(NTUs)	(mg/L)	OIG	Comments
	- 10 W	EASULEN	C 2034	TV-V					
	-ASIE	130 05	ELAD LEVA	<b>STANS</b>	2 2-4 aux	SE + 133			
							1		
				·					
	~								
				SAI	MPLING INFOR	MATION			
ample Met	thod	Stainless S	Steel Bailer		Peristaltic Pum		O	D.	
		Teflon Bai			Polyethylene B	-	Grundfos		Other:
omments:					· s.ysanyiene	, ulloi	Bladder P	ump	
	()-	24/12	16:00	100		N			
		y /-	10.00	1/101		NOT EN	bugh vol	me fal	PAHS
ample Con	tainers	Numbe	er of Containers		T	1-10	-		
<b>\$</b> 4			Z	J.	7	ds/Analyte Gro	oups: F	Preservative:	Filter (y/n)
-77	NM		<u> </u>	· · · · · · · · · · · · · · · · · · ·	Vi	00		HCL	
							-		
	-								
			. ^		Ţ				
ampler (Pri	nt Name)	T	am Wis	L	Sampler's Sign	ature			



				ENVIRONMENT			
Date: \/23/\Z	Start Tim	Start Time:		TAW			
	End Time	∋:	Field Personnel	1,1,-			
INITIAL MEASURI							
Measured Well Bottom (ft) しいらい Measured Depth to Water (ft) タップ				Well Casing Diameter :			
	Conversi 1.25" = 0	Conversion Factor (gal/lineal foot)					
Calculated Water Column (ft) \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				3" = 0.38			
Well Volumes (gal)	4" = 0.66	6" = 1.50	8" = 2.60				
WELL CONDIT	ONO						
			Not OK				
Not OK Cap Condition  Not OK Lock Condition				Well Riser			
DK Lock Condition DK Surface Seal	1/25	₹ OK	Not OK	Stainless Stee			
ounace Sear	Condition	OR.	Not OK	OK Steel			
				<b>₽</b> y/c			
pmen PURGE INFORMA	ATION						
Peristaltic Pump		Councilla	В				
Polyethylene Ba		Grundfos Pump Bladder Pump		er:			
	T	<del></del>	rump				
(S.U.) Conductivity	Turbidity (NTUs)	Dissolved Oxygen	ORP	Comments			
(mnos)	(11105)	(mg/L)		Comments			
x42N							
# 300 ml							
SAMPLING INFORM	ATION						
Peristaltic Pump	TION	0 12	oump Other				
Polyethylene, Bail	er	Grundfos P					
. Organization Ball	<u> </u>	Bladder Pu	mp				
yh-							
ers: Test Methods/	Analyte Group	os: Pi	reservative:	Filter (y/n)			
VOC	Tiller (y/I			- mor (y/m)			
PAH			• • • • • • • • • • • • • • • • • • • •				
	1						
	PAH		PAH Sampleria Sissal	PAH -			



Monitorin	g Well ID:	MW-5		Date	1/02/	0		· · · · · · · · · · · · · · · · · · ·		
Weather Conditions:		Dan	Date: 1/23/12		Start Time: End Time:		d .	TAN		
Commen	ts:					End 1	ime:	Persor	nnel	
					INITIAL MEASU	DEMENTO				
Measured	Well Botto	m (ft) \\.	ঞ		MITAL WILASO					
Measured Depth to Water (ft) 7.43					Well Casing Diameter : \( \( \lambda \)					
Calculated Water Column (ft) 4.7%					Conversion Factor (gal/lineal foot)					
One Well	One Well Volume (gal)  O-3 Three Well Volumes (gal)					$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			3" = 0.38	
Notes: Me	asurement	s from Top o	of Casing (TOC	;)	(gai)	4 - 0	.00	6" = 1.5	0	8" = 2.60
					WELL COND	ITIONS			<del></del>	
Casing Condition OK Not OK		<	Cap Condition		Œ	Not OK	$\neg \Gamma$	Well Riser		
Paint Condition		n ON	Not OK		<b>Lock Condition</b>		NA OK	Not OK Not OK		Stainless Steel
Notes:	Inner Casing Condition		Not OK		Surface Seal Condition		O)			Steel
110(65.										PV
			DEVELOP	200 E	PURGE INFORI	MATION				
Purge Met	hod	Stainless	Steel Bailer	1001	Peristaltic Pu		0 15			
Teflon Bailer			Polyethylene Bailer		Grundfos Pump Bladder Pump		Other:			
Time	Gallons Purged	Flow Rate (ml/min)	Temperature (°C)	PH (S.U.)	Specific Conductivity	Turbidity (NTUs)	Dissolved Oxygen	ORP		Comments
	- 4/2 40	205.4			(mhos)	(11103)	(mg/L)			Comments
	- vel - =	A SINCO	12027	25.20						
	- 100 I	2 DE 112	w revac	JP.	211					
				<del></del>						
									<del></del>	
						-				
<b>\</b>				SA	MPLING INFOR	MATION				
Sample Method Stainless Steel Bailer Teflon Bailer			Peristaltic Pump Polyethylene Bailer		Grundfos Pump Other:					
comments:		_			- Janjione B	uno:	Bladder Pu	ump		
	V	24/12		11/12	Am					
ample Cont	tainers	Numbe	er of Containers	3:	Test Mother	la/Amal : G				
40 mg				Test Methods/Analyte Gro		- Tiller (y/II)				
40 ~ 3				YDC	401 -					
					PA	H				
ampler (Prir	nt Name)		in Deie		Sampler's Signa	ature	ma 1)-			